HONDA

SERVICE MANUAL

86-87

VT700C

Shadow®

IMPORTANT SAFETY NOTICE

WARNING ***Indicates a strong possibility of severe personal injury or loss of life if instructions are not followed.***

CAUTION: *Indicates a possibility of personal injury or equipment damage if instructions are not followed.*

NOTE: Gives helpful information.

Detailed descriptions of standard workshop procedures, safety principles and service operations are not included. It is important to note that this manual contains some warnings and cautions against some specific service methods which could cause **PERSONAL INJURY** to service personnel or could damage a vehicle or render it unsafe. Please understand that those warnings could not cover all conceivable ways in which service, whether or not recommended by Honda, might be done or of the possibly hazardous consequences of each conceivable way, nor could Honda investigate all such ways. Anyone using service procedures or tools, whether or not recommended by Honda, *must satisfy himself thoroughly* that neither personal safety nor vehicle safety will be jeopardized by the service methods or tools selected.

HOW TO USE THIS MANUAL

Follow the Maintenance Schedule (Section 3) recommendations to ensure that the vehicle is in peak operating condition and the emission levels are within the standards set by the U.S. Environmental Protection Agency and California Air Resources Board. Performing the first scheduled maintenance is very important. It compensates for the initial wear that occurs during the break-in period.

Sections 1 through 3 apply to the whole motorcycle, while sections 4 through 21 describe parts of the motorcycle, grouped according to location.

Find the section you want on this page, then turn to the table of contents on page 1 of that section.

Most sections start with an assembly or system illustration, service information and troubleshooting for the section. The subsequent pages give detailed procedures.

If you don't know the source of the trouble, go to section 23, Troubleshooting.

HONDA MOTOR CO., LTD.
SERVICE PUBLICATIONS OFFICE

CONTENTS

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1. GENERAL INFORMATION

GENERAL SAFETY

WARNING

If the engine must be running to do some work, make sure the area is well-ventilated. Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas.

WARNING

Gasoline is extremely flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.

WARNING

The battery electrolyte contains sulfuric acid. Protect your eyes, skin and clothing. In case of contact, flush thoroughly with water and call a doctor if electrolyte gets in your eyes.

WARNING

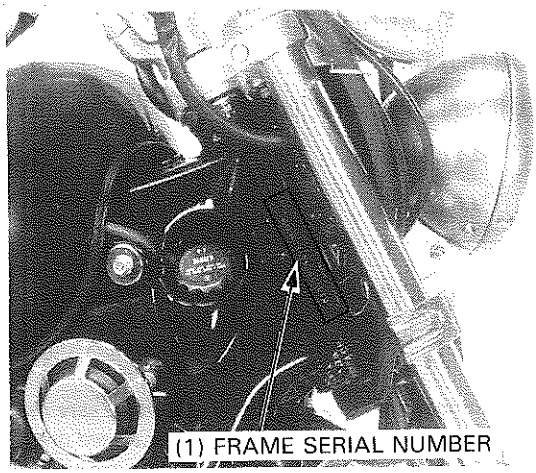
The battery generates hydrogen gas which can be highly explosive. Do not smoke or allow flames or sparks near the battery, especially while charging it.

SERVICE RULES

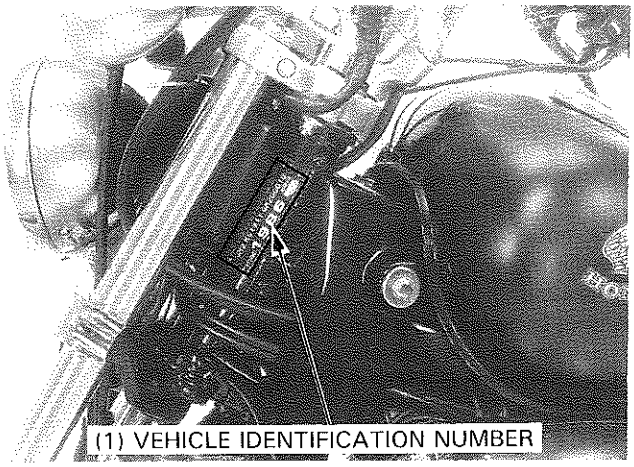
1. Use genuine HONDA or HONDA-recommended parts and lubricants or their equivalents. Parts that do not meet HONDA's design specifications may damage the motorcycle.
2. Use the special tools designed for this product.
3. Use only metric tools when servicing this motorcycle. Metric bolts, nuts, and screws are not interchangeable with English fasteners. The use of incorrect tools and fasteners may damage the motorcycle.
4. Install new gaskets, O-rings, cotter pins, lock plates, etc. when reassembling.
5. When tightening bolts or nuts, begin with the larger-diameter of inner bolts first, and tighten to the specified torque diagonally, unless a particular sequence is specified.
6. Clean parts in cleaning solvent upon disassembly. Lubricate any sliding surfaces before reassembly.
7. After reassembly, check all parts for proper installation and operation.
8. Route all electrical wires as shown on pages 1-10 through 1-14, Cable and Harness Routing.

MODEL IDENTIFICATION

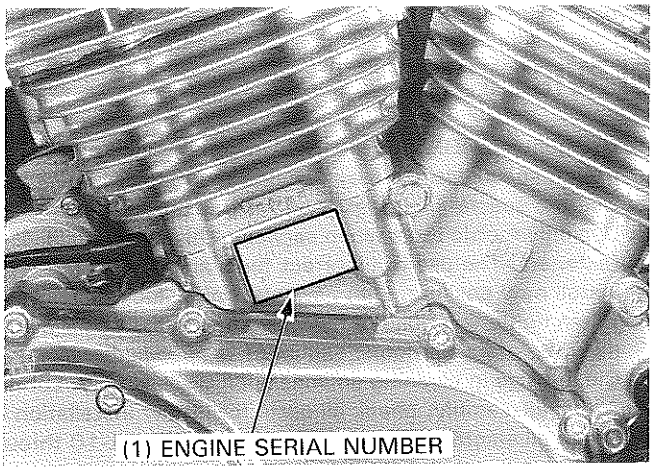
BEGINNING FRAME No. RC190*GM200005
FRAME No. RC191*GM200001
(California model)
ENGINE No. RC19E-2200004



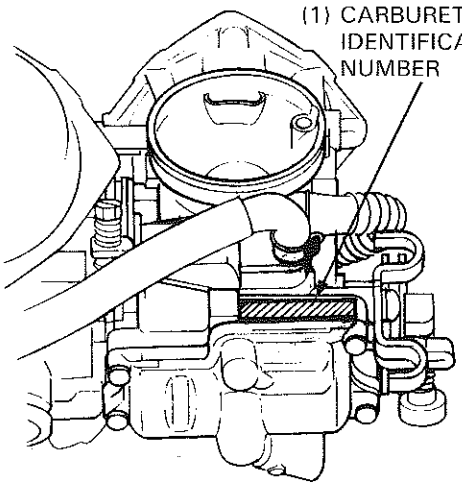
The frame serial number is stamped on the right side of the steering head.



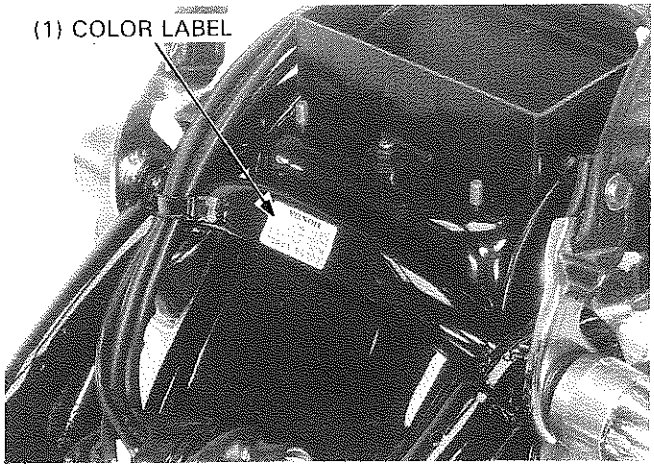
The vehicle identification number (VIN) is attached on the left side of the steering head.



The engine serial number is stamped on the right carnkcase below the rear cylinder.



The carburetor identification number is stamped on the carburetor body intake side.



The color label is attached to the frame pipe on the fuel sub-tank.

SPECIFICATIONS

[ ]: California model

ITEM				SPECIFICATIONS
DIMENSIONS	Overall length Overall width Overall height Wheelbase Seat height Foot peg height Ground clearance Dry weight Curb weight			2,310 mm (90.9 in) 805 mm (31.7 in) 1,190 mm (46.9 in) 1,605 mm (63.2 in) 710 mm (28.0 in) 325 mm (12.8 in) 145 mm (5.7 in) 221 kg (487 lb) 236 kg (520 lb)
FRAME	Type Front suspension, travel Rear suspension, travel Gross vehicle weight rating Vehicle capacity load Front tire size Rear tire size			Double cradle Telescopic fork, 145 mm (5.7 in) Swingarm, 103 mm (4.1 in) 401 kg (884 lb) 163 kg (359 lb) 100/90—19 57H 140/90—15 70H
	Cold tire pressure	Up to 90 kg (200 lb) load	Front Rear	32 psi (225 kPa, 2.25 kg/cm²) 32 psi (225 kPa, 2.25 kg/cm²)
		Up to vehicle capacity load	Front Rear	32 psi (225 kPa, 2.25 kg/cm²) 40 psi (280 kPa, 2.80 kg/cm²)
	Front brake, lining swept area Rear brake, lining swept area Fuel capacity Fuel reserve capacity Caster angle Trail length Front fork oil capacity Front fork air pressure			Single disc, 490 cm² (76.0 sq in) Drum, 198 cm² (30.7 sq in) 12.0 lit (3.18 US gal, 2.64 Imp gal) 2.5 lit (2.65 US qt, 2.20 Imp qt) 56°50' 156 mm (6.14 in) 445 cc (15.2 US oz, 15.7 Imp oz) 0—4 psi (0—40 kPa, 0—0.4 kg/cm²)
ENGINE	Type Cylinder arrangement Bore and stroke Displacement Compression ratio Valve train Maximum horsepower Maximum torque Oil capacity Coolant capacity Lubrication system Air filtration Cylinder compression Intake valve Opens Closes Exhaust valve Opens Closes Valve clearance Engine weight Idle speed			Water cooled twin 4-stroke SOHC engine 2 cylinders 45°V 76.5 x 75.5 mm (3.01 x 2.97 in) 694 cc (42.3 cu-in) 9.8:1 Silent, multi-link chain drive and OHC with rocker arms 57 BHP/7,000 rpm (SAE J245), 55PS/7,000 rpm 6.3 kg-m (45.54 ft-lb)/5,500 rpm 3.5 lit (3.7 US qt, 3.1 Imp qt) after disassembly 3.0 lit (3.2 US qt, 2.6 Imp qt) after draining 1.56 lit (1.65 US qt, 1.37 Imp qt) engine and radiator 0.27 lit (0.29 US qt, 0.24 Imp qt) reservoir tank Forced pressure and wet sump Paper filter 1,275 ± 196 kPa (13 ± 2 kg/cm², 185 ± 28 psi) 5° BTDC 35° ABDC 40° BBDC 5° ATDC } at 1 mm lift Hydraulic 80 kg (176 lb) 1,000 ± 100 rpm [1,100 ± 100 rpm]
CARBURETION	Carburetor type			Constant Vacuume dual carburetor
	Identification number		'86: After '86:	VD7CC [VD7BC] VDGCA [VDGDA]
	Pilot screw initial setting			See page 4-8
	Float level			9.0 mm (0.35 in) [8.0 mm (0.31 in)]

ITEM		SPECIFICATIONS
DRIVE TRAIN	Clutch	Hydraulic, multi-plate
	Transmission	5-speed + O.D. (with over drive)
	Primary reduction	1,737 (38/66)
	Secondary reduction	0,806 (36/29)
	Third reduction	1,188 (16/19)
	Final reduction	3,400 (34/10)
	Gear ratio I	2,294 (17/39)
	Gear ratio II	1,650 (20/33)
	Gear ratio III	1,304 (23/30)
	Gear ratio IV	1,077 (26/28)
	Gear ratio V	0,897 (29/26)
	Gear ratio O.D. (Over drive)	0,750 (32/24)
	Gearshift pattern	Left foot operated return system, 1-N-2-3-4-5-O.D.
	Final drive gear oil capacity	150 cc (5.1 oz) after disassembly 130 cc (4.4 oz) after draining
ELECTRICAL	Ignition	Full transistor ignition
	Ignition timing "F" mark	10° BTDC at idle
	Full advance	26° BTDC at 4,000 rpm
	Pulse generator air gap	0.30—0.70 mm (0.012—0.028 in)
	Starting system	Starter motor
	Alternator	340 W/5,000 rpm
	Battery capacity	12V—14AH
	Spark plug	

	NGK	ND
Standard	DPR7EA-9	X22EPR-U9
For cold climate (Below 5°C, 41°F)	DPR6EA-9	X20EPR-U9
For extended high speed riding	DPR8EA-9	X24EPR-U9

	Spark plug gap	0.80—0.90 mm (0.031—0.035 in)
	Firing order	Front—225°—Rear—495°—Front
	Fuse/Main fuse	10A x 6, 15A, 30A
LIGHTS	Headlight (high/low beam)	12V—60/55W
	Tail/brakelight ('86 only:)	12V—2/32 cp SAE No. 1157
	(After '86:)	12V—2/32 cp x 2
	Front turn signal/running light	12V—32/3 cp SAE No. 1034
	Rear turn signal light	12V—32 cp SAE No. 1073
	Instrument lights	12V—3W x 3
	Oil pressure warning light	12V—3.4W
	Tail/brakelight warning indicator ('86 only:)	12V—3.4W
	High beam indicator	12V—3.4W
	Turn signal indicator	12V—3.4W x 2
	Neutral indicator	12V—3.4W
	Overdrive indicator	12V—3.4W
	Fuel level warning light	12V—3.4W

TORQUE VALUES

ENGINE

Item	Q'ty	Thread dia. (mm)	Torque N·m (kg-m, ft-lb)	Remark
Spark plug sleeve	2	30	10—15 (1.0—1.5, 7—11)	Apply molybdenum disulfide grease to the threads.
Clutch lock nut	1	22	80—100 (8.0—10.0, 58—72)	
Right crankcase cover bolt	15	6	8—12 (0.8—1.2, 6—9)	
Clutch cover bolt	7	6	8—12 (0.8—1.2, 6—9)	
Oil filter cartridge	1	20	15—20 (1.5—2.0, 11—15)	
Oil drain plug	1	14	30—40 (3.0—4.0, 22—29)	
Neutral switch	1	10	10—14 (1.0—1.4, 7—10)	
Primary drive gear	1	12	95—105 (9.5—10.5, 69—77)	UBS bolt, Apply oil to the threads.
Flywheel bolt	1	12	80—100 (8.0—10.0, 58—72)	Left hand threads, Apply oil to the threads.
Left crankcase cover bolt	9	6	8—12 (0.8—1.2, 6—9)	
Spark plug	2	12	12—16 (1.2—1.6, 9—12)	
Final drive shaft bolt	1	10	45—55 (4.5—5.5, 33—40)	Special bolt, Apply a locking agent.
Oil control bolt	1	10	20—25 (2.0—2.5, 15—18)	
Cylinder head cover	8	10	38—42 (3.8—4.2, 27—30)	Cap nut
	14	8	25—29 (2.5—2.9, 18—21)	Cap nut and flange bolt
Connecting rod nut	4	9	41—45 (4.1—4.5, 30—33)	Apply oil to the thread.
Output gear case	5	8	30—34 (3.0—3.4, 22—24)	UBS bolt
Crankcase bolt	14	8	25—29 (2.5—2.9, 18—21)	
	6	6	24—30 (2.4—3.0, 17—22)	
Shift fork bolt	1	6	8—12 (0.8—1.2, 6—9)	
Starter one way clutch	6	8	21—25 (2.5—2.5, 15—18)	Socket bolt, Apply a locking agent.
Oil pressure switch	1	——	10—14 (1.0—1.4, 7—10)	Apply a locking agent.
Cam sprocket	4	7	16—20 (1.6—2.0, 12—15)	UBS bolt
Shift drum bearing set plate screw	1	6	7—11 (0.7—1.1, 5—8)	Flange screw, Apply a locking agent
bolt	1	6	8—12 (0.8—1.2, 6—9)	Flange bolt, Apply a locking agent
Bearing set plate bolt	3	6	8—12 (0.8—1.2, 6—9)	Flange bolt, Apply a locking agent.
Stopper arm pivot bolt	1	6	8—12 (0.8—1.2, 6—9)	Apply a locking agent
Oil pipe bolt	2	7	10—14 (1.0—1.4, 7—10)	Special bolt
Insulator band screw	4	5	1—3 (0.1—0.3, 0.7—2.2)	
Timing hole cap	1	45	15—20 (1.5—2.0, 11—15)	Apply molybdenum disulfide grease to the thread.
Oil pump driven sprocket	1	6	15—20 (1.5—2.0, 11—15)	Flange bolt
Assist shaft cap bolt	6	14	20—24 (2.0—2.4, 15—17)	
Rocker arm shaft hole plug	6	20	35—45 (3.5—4.5, 25—33)	
Output shaft bearing lock nut inner	1	30	70—80 (7.0—8.0, 51—58)	
outer	1	64	90—110 (9.0—11.0, 65—80)	
Final drive shaft bearing lock nut				
inner	1	30	70—80 (7.0—8.0, 51—58)	
outer	1	64	90—110 (9.0—11.0, 65—80)	
Final drive shaft bearing holder bolt	4	8	30—34 (3.0—3.4, 22—24)	

FRAME

Item	Q'ty	Thread dia. (mm)	Torque N·m (kg-m, ft-lb)	Remark
Front engine mounting bolt	1	10	45–60 (4.5–6.0, 33–43)	
Rear lower engine mounting bolt	1	12	60–70 (6.0–7.0, 43–51)	Apply oil to the thread.
Rear upper engine mounting bolt	1	10	45–60 (4.5–6.0, 33–43)	
Front engine mounting bracket	2	8	30–40 (3.0–4.0, 43–51)	
Front sub-frame bolt	2	10	60–70 (6.0–7.0, 43–51)	Apply oil to the threads.
Rear sub-frame bolt	2	10	35–45 (3.5–4.5, 25–33)	
Exhaust pipe protector band	2	6	7–11 (0.7–1.1, 5–8)	
Exhaust pipe joint nut	4	6	8–14 (0.8–1.4, 6–10)	
Muffler band	2	8	15–25 (1.5–2.5, 11–18)	
Muffler stay	2	8	18–25 (1.8–2.5, 13–18)	
Fuel tank mounting bolt	2	8	18–25 (1.8–2.5, 13–18)	
Clutch oil bolt	1	10	25–35 (2.5–3.5, 18–25)	
Clutch master cylinder holder bolt	2	6	10–14 (1.0–1.4, 7–10)	
Clutch reservoir cover screw	2	4	1–2 (0.1–0.2, 0.7–1.4)	
Brake oil bolt	2	10	25–35 (2.5–3.5, 18–25)	
Brake master cylinder holder bolt	2	6	10–14 (1.0–1.4, 7–10)	
Brake reservoir cover screw	2	4	1–2 (0.1–0.2, 0.7–1.4)	
Bleed valve	1	7	4–7 (0.4–0.7, 2.9–5.1)	
Caliper mounting bolt	1	10	30–40 (3.0–4.0, 22–29)	Flange bolt
Caliper pin bolt	1	10	25–30 (2.5–3.0, 18–22)	Flange bolt
Pad pin retainer bolt	1	6	8–13 (0.8–1.3, 6–9)	Flange bolt
Front fork top pinch bolt	2	7	9–13 (0.9–1.3, 7–9)	
Front fork bottom pinch bolt	2	10	45–55 (4.5–5.5, 33–40)	Apply oil to the thread.
Fork tube cap	2	35	15–30 (1.5–3.0, 11–22)	
Fork socket bolt	2	8	15–25 (1.5–2.5, 11–18)	Apply a locking agent.
Steering bearing adjustment nut	1	26	23–27 (2.3–2.7, 17–20)	
Steering stem nut	1	24	90–120 (9.0–12.0, 65–87)	Flange nut
Front axle nut	1	14	55–65 (5.5–6.5, 40–47)	
Front axle holder nut	4	8	27–33 (2.7–3.3, 20–24)	
Handlebar upper holder bolt	4	8	20–30 (2.0–3.0, 15–22)	
Rear axle nut	1	18	80–100 (8.0–10.0, 58–72)	
Rear axle pinch bolt	1	8	24–30 (2.4–3.0, 17–22)	Flange bolt
Rear shock absorber upper mounting bolt	2	8	24–30 (2.4–3.0, 17–22)	Flange bolt
Rear shock absorber lower mounting nut (L)	1	10	30–40 (3.0–4.0, 22–29)	Cap nut
bolt (R)	1	10	30–40 (3.0–4.0, 22–29)	Flange bolt
Final gear case attaching nut		10	60–70 (6.0–7.0, 43–51)	UBS nut
Swingarm left pivot bolt	1	23	80–120 (8.0–12.0, 58–87)	
Swingarm right pivot bolt	1	23	8–12 (0.8–1.2, 6–9)	
Swingarm right pivot lock nut	1	23	80–120 (8.0–12.0, 58–87)	
Final drive oil filler cap	1	30	10–14 (1.0–1.4, 7–10)	
Gearshift pedal bolt	1	8	18–25 (1.8–2.5, 13–18)	
Brake pedal bolt	1	8	24–30 (2.4–3.0, 17–22)	
Center stand pivot bolt	1	10	30–40 (3.0–4.0, 22–29)	
Side stand pivot bolt	1	10	20–30 (2.0–3.0, 15–22)	
Foot peg bolt	4	8	24–30 (2.4–3.0, 17–22)	
Thermostatic switch	1	16	24–32 (2.4–3.2, 17–23)	
Final driven flange bolt	5	10	50–60 (5.0–6.0, 36–43)	
Shock absorber damper lock nut	2	12	25–40 (2.5–4.0, 18–29)	

Item	Q'ty	Thread dia. (mm)	Torque N·m (kg-m, ft-lb)	Remark
Brake disc bolt	5	8	37—43 (3.7—4.3, 27—31)	Apply oil or grease to the thread.
Pinion bearing retainer	1	——	100—120 (10.0—12.0, 72—87)	
Pinion nut	1	16	100—120 (10.0—12.0, 72—87)	
Gear case cover bolt	2	10	45—50 (4.5—5.0, 33—36)	
	6	8	23—28 (2.3—2.8, 17—20)	
Rear brake arm bolt	1	6	24—30 (2.4—3.0, 17—22)	

Torque specifications listed above are for specific tightening points. If a specification is not listed, follow the standard torque values below.

STANDARD TORQUE VALUES

TYPE	TORQUE N·m (kg-m, ft-lb)	TYPE	TORQUE N·m (kg-m, ft-lb)
5 mm bolt, nut	4.5—6.0 (0.45—0.6, 3,3—4.3)	5 mm screw	3.5—5 (0.35—0.5, 2.5—3.6)
6 mm bolt, nut	8—12 (0.8—1.2, 6—9)	6 mm screw, 6 mm	
8 mm bolt, nut	18—25 (1.8—2.5, 13—18)	bolt with 8 mm head	7—11 (0.7—1.1, 5—8)
10 mm bolt, nut	30—40 (3.0—4.0, 22—29)	6 mm flange bolt, nut	10—14 (1.0—1.4, 7—10)
12 mm bolt, nut	50—60 (5.0—6.0, 36—43)	8 mm flange bolt, nut	24—30 (2.4—3.0, 17—22)
		10 mm flange bolt, nut	35—45 (3.5—4.5, 25—33)

TOOLS

SPECIAL

Description	Tool number	Alternative tool	Tool number	Ref.Sec.
Oil pressure gauge	07506—3000000	Equivalent commercially		2
Oil pressure gauge attachment	07510—4220100	available in U.S.A.		2
Oil filter wrench	07912—6110001			2
Vacuum gauge	07404—0030000	Vacuum gauge	M937B-021-XXXXX	3
Pilot screw wrench	07908—4220201			3
Vacuum/Pressure pump	A937X-041-XXXXX	Vacuum pump	ST-AH-260-MC7	4
		Pressure pump	ST-AH-255-MC7	4
Valve guide driver, 7mm	07942—8230002			4
Snap ring pliers	07914—3230001	Equivalent commercially available in U.S.A.		8
Shaft holer	07923—6890100			7,12,13,
Flywheel holder	07925—ME90000	Equivalent commercially available in U.S.A.		8
Hydraulic tappet bleeder	07973—MJ00000			10
Valve guide reamer	07984—5510000	Not available in U.S.A.		10
	07984—657010A	U.S.A. only		
Fork tube holder attachment	07930—KA50100			10
Main bearing remover attachment	07946—ME90100			13
Main bearing driver attachment	07946—ME90200			13
Snap ring pliers	07914—5670100	Equivalent commercially available in U.S.A.		13
Damper spring compressor	07964—ME90000	Not available in U.S.A.		13
		Assembly bolt	07965—1660200	
		Assembly collar	07965—1660300	
		Compressor seat	07967—9690200	
		Threaded adaptor	07965—KA30000	
Lock nut wrench, 30 x 64 mm	07916—MB00001			13
Dis/Assembly tool	07965—3710101			13
Bearing remover, 17 mm	07936—3710300			13
Remover handle	07936—3710100			13
Remover weight	07741—0010201	Remover weight	07936—3710200	13
Bearing remover set, 20 mm	07936—3710001	Not available in U.S.A.		13
—bearing remover, 20 mm	(07936—3710600)			13
—remover handle	(07936—3710100)			13
—remover weight	(07741—0010201)	Remover weight	07936—3710200	13
Pinion joint holder	07926—ME90000			14
Retainer wrench	07910—ME80000			14
Pinion puller set	07935—MB00000			14
Attachment	07945—3330300			14
Bearing race insert attachment	07931—4630300	Not available in U.S.A.		14
Bearing puller & driver attachment	07934—MB00000	Pilot, 40 mm	07746—0040900	14
Steering stem socket	07916—3710100			14
Fork seal driver	07947—4630100			14
Ball race remover	07953—MJ10000	Attachment	07953—MJ0000A	15
—attachment	07953—MJ10100			
—handle	07953—MJ10200			
Ball race remover	07953—4250002			15
Ball race remover attachment	07946—3710500			15
Steering stem driver	07946—MB00000			15
Shock absorber compressor attachment	07959—MB10000			16
Lock nut wrench	07908—ME90000			16
Socket bit, 10 mm	07703—0020200	Equivalent commercially		16
Socket bit, 14 mm	07703—0020400	available in U.S.A.		16

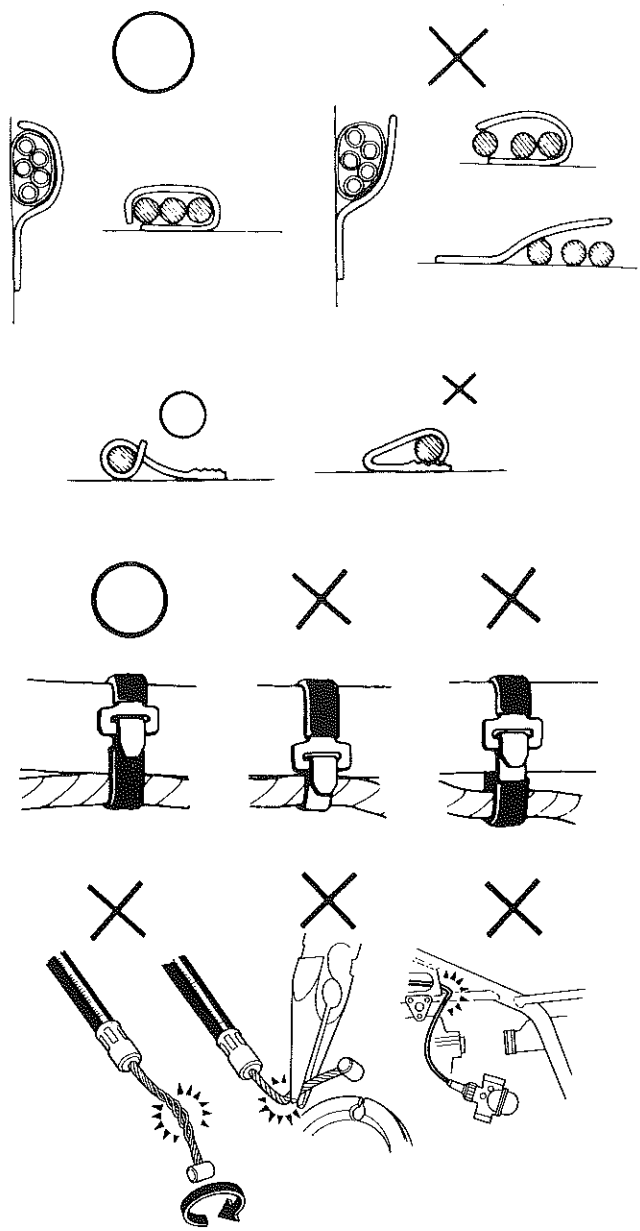
COMMON

Description	Tool number	Alternative tool	Tool number	Ref.Sec.
Float level gauge	07401—0010000			4
Gear holder	07724—0010100	—Not available in U.S.A.		7
Lock nut wrench	07716—0020203			7
Driver	07749—0010000			7,13,14, 15,16
Attachment, 37 x 40 mm	07746—0010200			7
Pilot, 35 mm	07746—0040800			7
Rotor puller	07733—0020001	—Rotor puller	07933—3950000	8
Valve spring compressor	07757—0010000	—Valve spring compressor	07957—3290001	10
Valve guide remover	07742—0010200	—Valve guide remover	07942—6570100	10
Valve guide driver	07743—0020000	—Not available in U.S.A.		10
Attachment, 32 x 35 mm	07746—0010100			13,14
Attachment, 42 x 47 mm	07746—0010300			13,14,15, 16
Attachment, 52 x 55 mm	07746—0010400			13,14
Attachment, 62 x 68 mm	07746—0010500			13
Pilot, 17 mm	07746—0040400			13
Pilot, 20 mm	07746—0040500			13,16
Pilot, 25 mm	07746—0041100			13
Pilot, 30 mm	07746—0040700			13,14
Inner driver	07746—0030100			13,14
Attachment, 30 mm ID	07746—0030300			13
Attachment, 25 mm ID	07746—0030200			14
Bearing remover shaft	07746—0050100	Equivalent commercially		15,16
Bearing remover head, 15 mm	07746—0050400	available in U.S.A.		15
Pilot, 15 mm	07746—0040300			15
Lock nut wrench, 30 x 32 mm	07716—0020400	Equivalent commercially		15
Extension bar	07716—0020500	available in U.S.A.		15
Bearing remover head, 20 mm	07746—0050600			16
Shock absorber compressor	07959—3290001			16

CABLE & HARNESS ROUTING

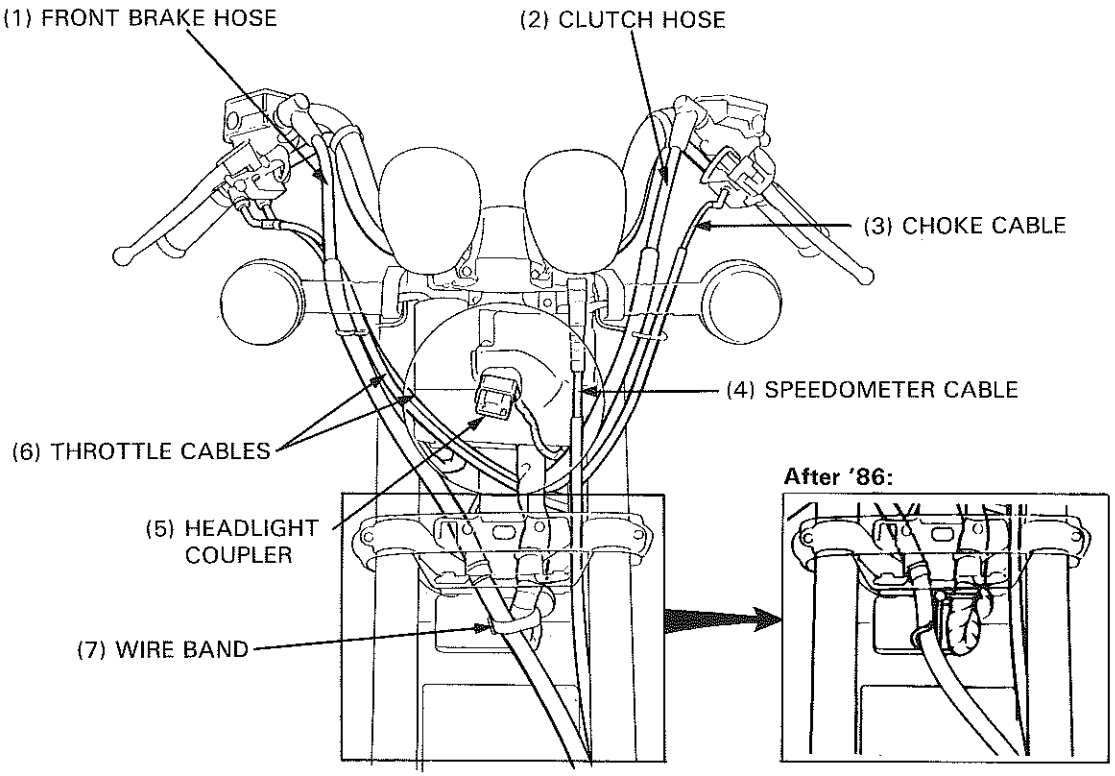
Note the following when routing cables and wire harnesses:

- A loose wire, harness or cable can be a safety hazard. After clamping, check each wire to be sure it is secure.
- Do not squeeze wires against weld or clamps.
- Secure wires and wire harnesses to the frame with their respective wire bands at the designated locations. Tighten the bands so that only the insulated surfaces contact the wires or wire harnesses.
- Route harnesses so they are neither pulled taut nor have excessive slack.
- Protect wires and harnesses with electrical tape or tube if they contact a sharp edge or corner. Clean the attaching surface thoroughly before applying tape.
- Do not use a wire or harness with a broken insulator. Repair by wrapping them with protective tape or replace them.
- Route wire harnesses to avoid sharp edges or corners. Also avoid the projected ends of bolts and screws.
- Keep wire harnesses away from the exhaust pipes and other hot parts.
- Be sure grommets are seated in their grooves properly.
- After clamping, check each harness to be certain that it does not interfere with any moving or sliding parts.
- After routing, check that the wire harnesses are not twisted or kinked.
- Wire harnesses routed along the handlebars should not be pulled taut, have excessive slack, be pinched by or interfere with adjacent or surrounding parts in all steering positions.
- Do not bend or twist the control cables. Damaged control cables will not operate smoothly and may stick or bind.

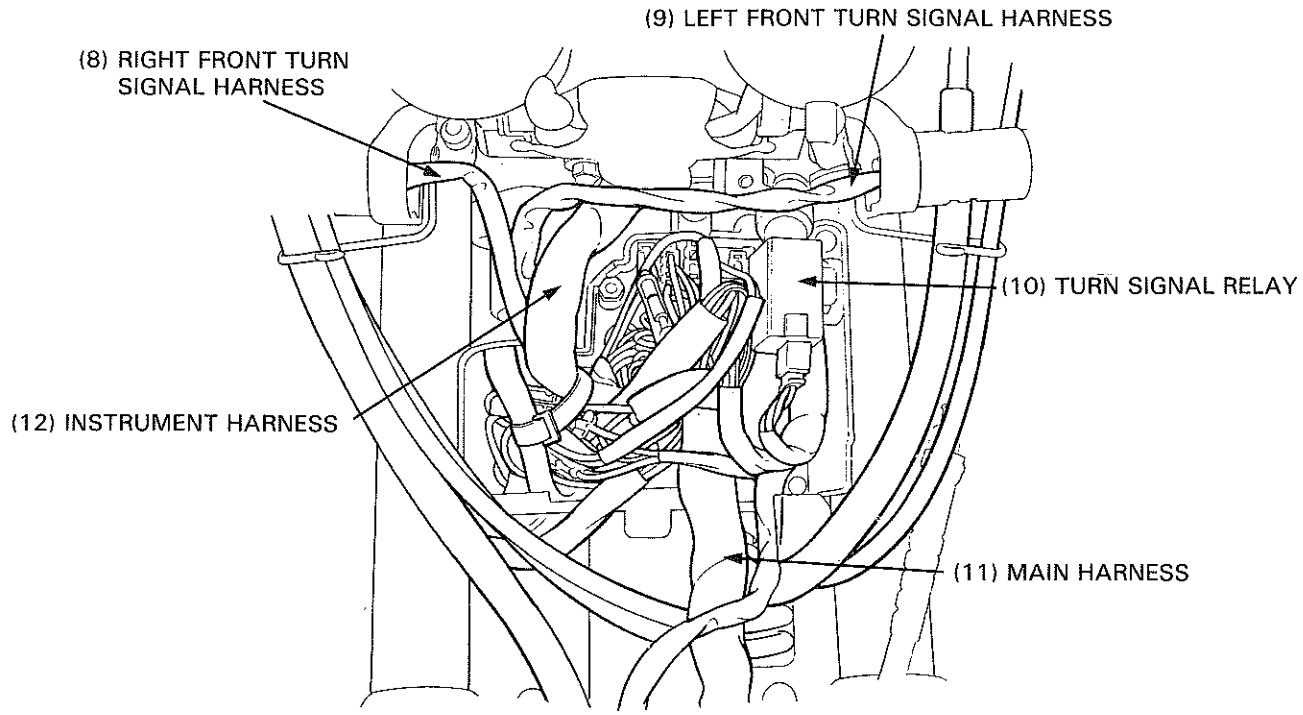


O: CORRECT
×: INCORRECT

'86:



'86, After '86:



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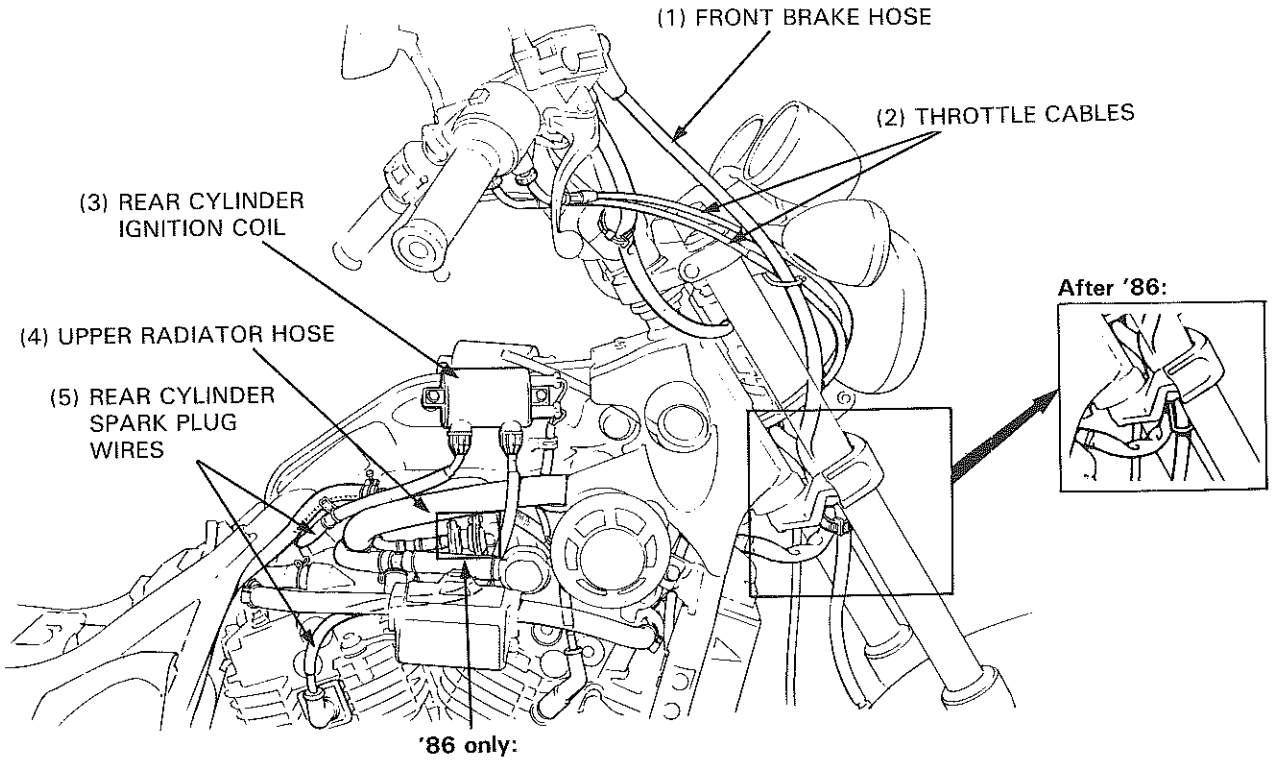
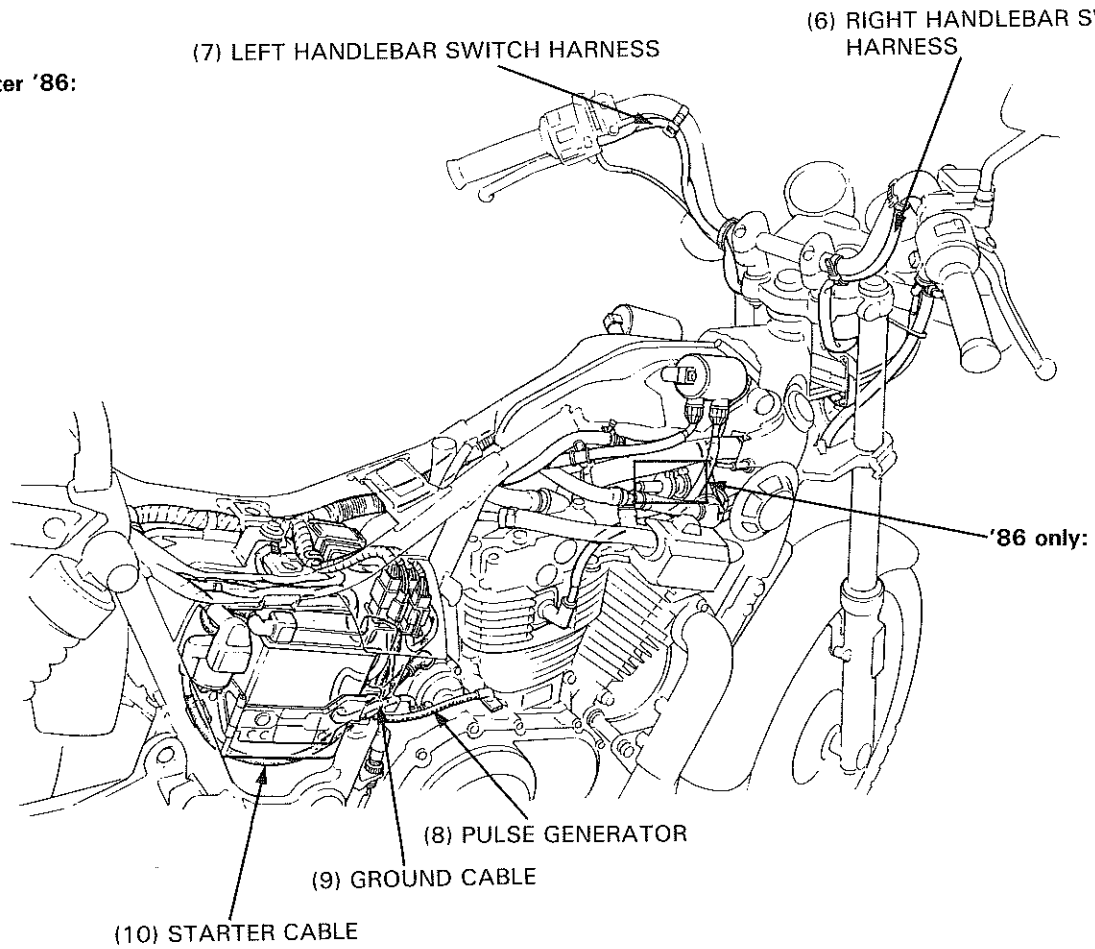
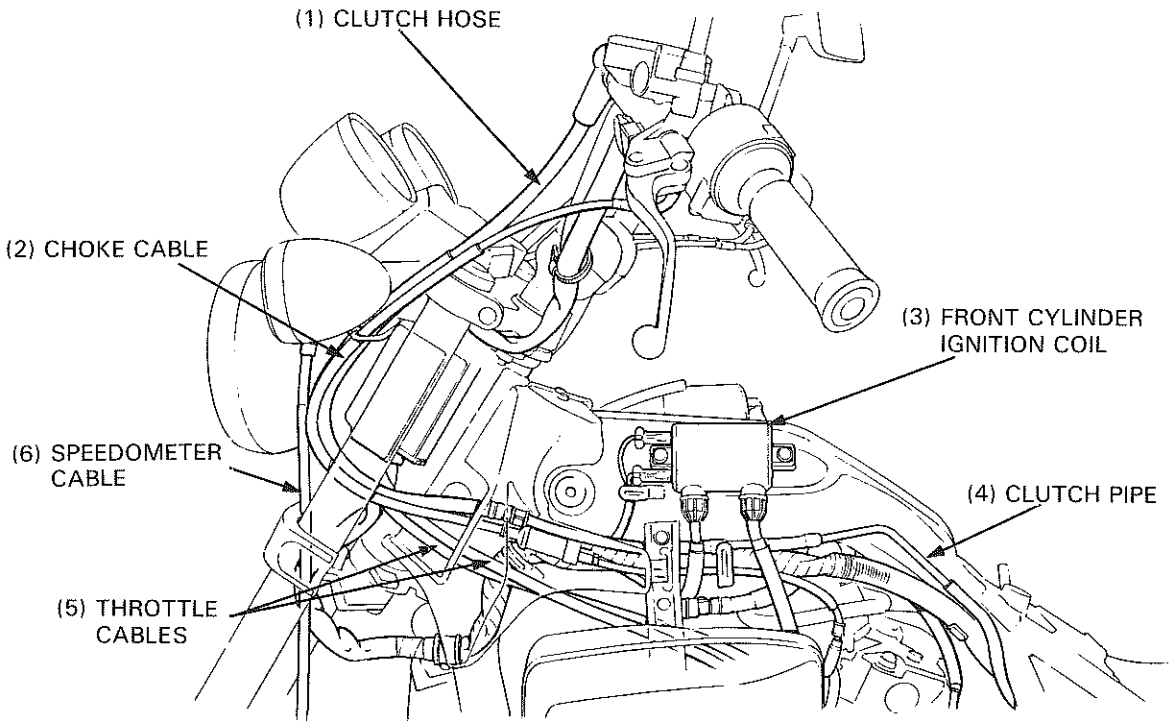
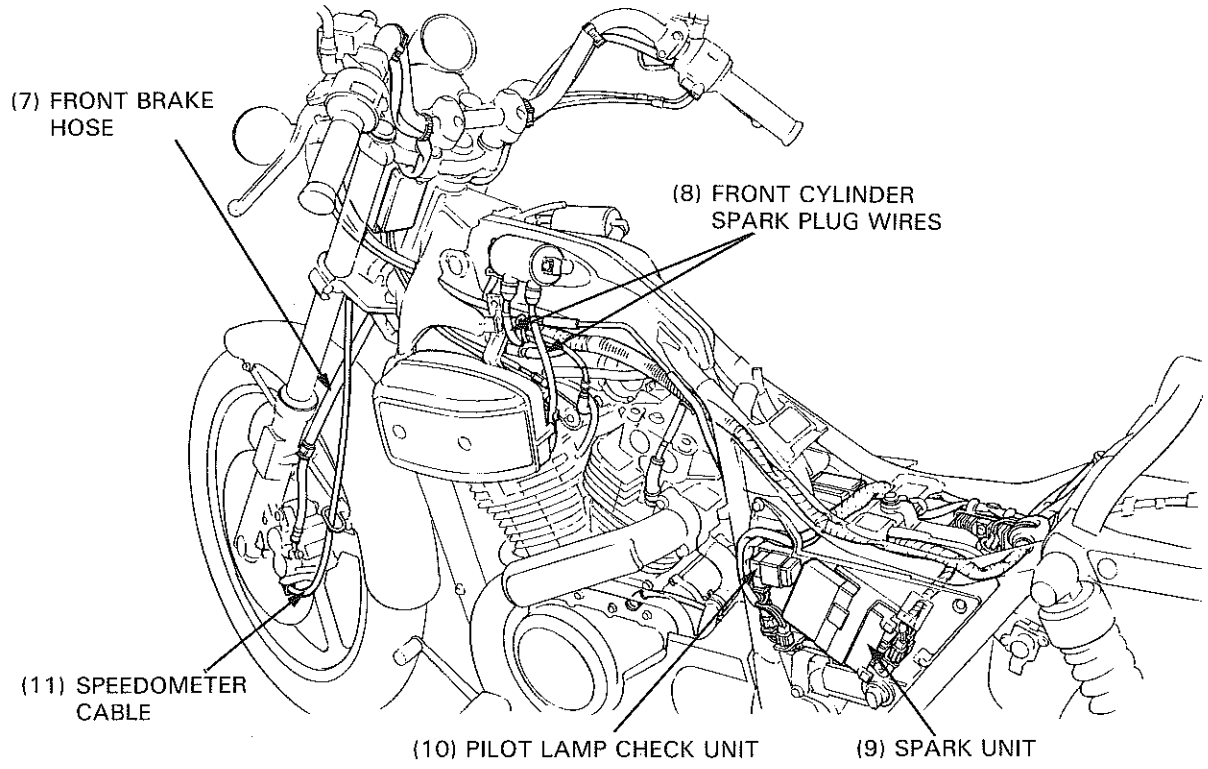
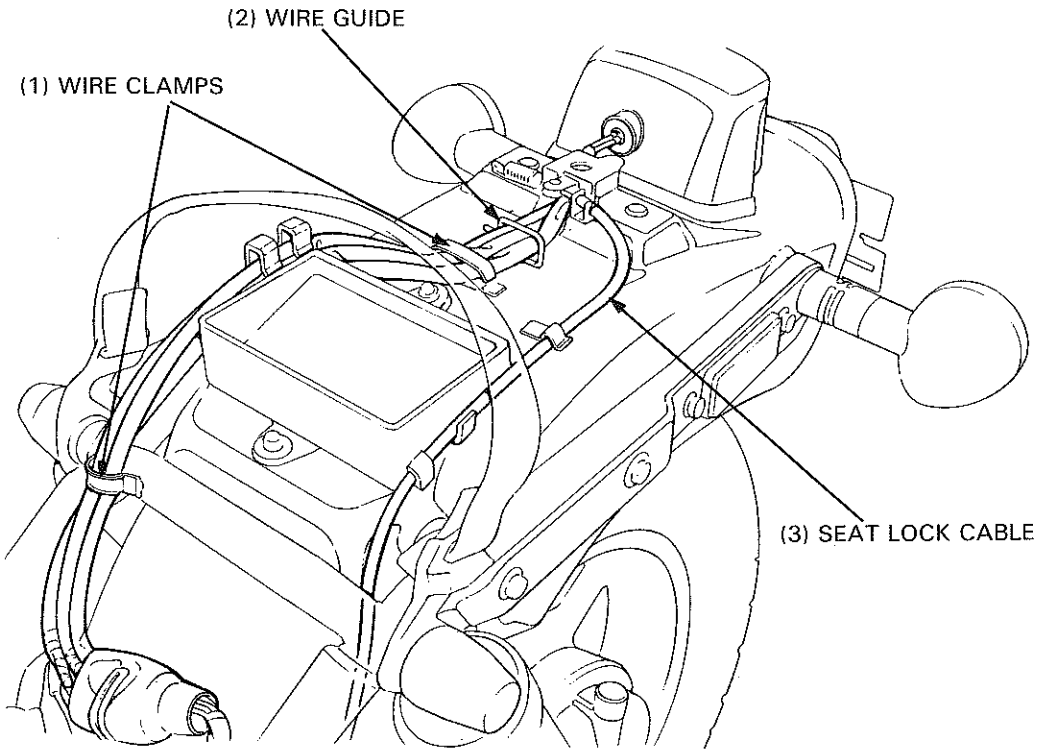


'86, After '86:




(1) CLUTCH HOSE
(2) CHOKE CABLE
(3) FRONT CYLINDER IGNITION COIL
(6) SPEEDOMETER CABLE
(4) CLUTCH PIPE
(5) THROTTLE CABLES


(7) FRONT BRAKE HOSE
(8) FRONT CYLINDER SPARK PLUG WIRES
(11) SPEEDOMETER CABLE
(10) PILOT LAMP CHECK UNIT
(9) SPARK UNIT


(2) WIRE GUIDE
(1) WIRE CLAMPS
(3) SEAT LOCK CABLE

EMISSION CONTROL SYSTEMS

The U.S. Environmental Protection Agency and California Air Resources Board (CARB) require manufacturers to certify that their motorcycles comply with applicable exhaust emissions standards during their useful life, when operated and maintained according to the instructions provided, and that motorcycles built after January 1, 1983 comply with applicable noise emission standards for one year or 6,000 km (3,730 miles) after the time of sale to the ultimate purchaser, when operated and maintained according to the instructions provided. Compliance with the terms of the Distributor's Limited Warranty for Honda Motorcycle Emission Control Systems is necessary in order to keep the emissions system warranty in effect.

SOURCE OF EMISSIONS

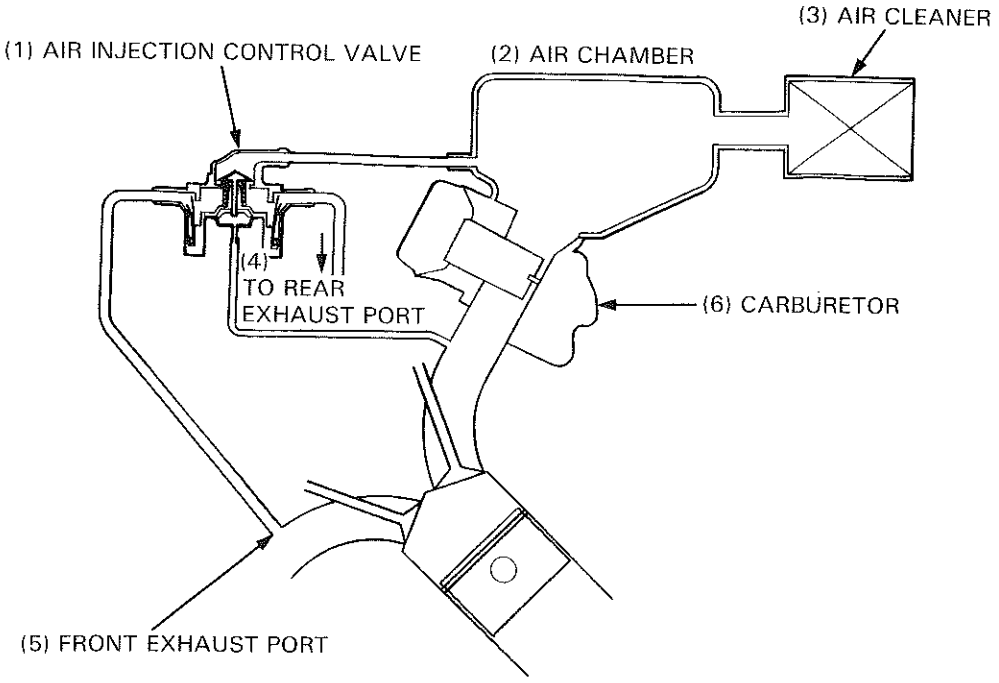
The combustion process produces carbon monoxide and hydrocarbons. Control of hydrocarbons is very important because, under certain conditions, they react to form photochemical smog when subjected to sunlight. Carbon monoxide does not react in the same way, but it is toxic.

Honda Motor Co., Ltd. utilizes lean carburetor settings as well as other systems, to reduce carbon monoxide and hydrocarbons.

EXHAUST EMISSION CONTROL SYSTEM

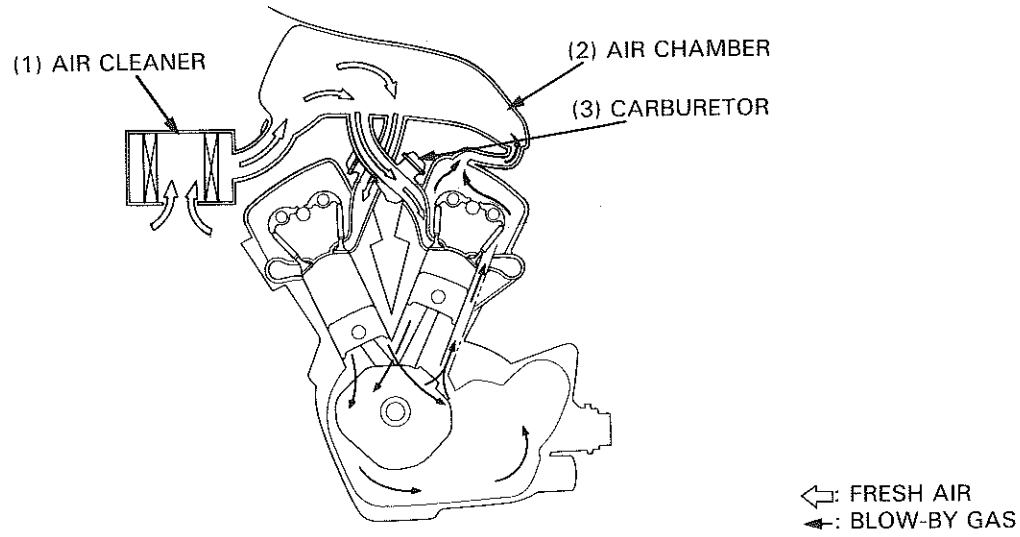
Except for California:
The exhaust emission control system is composed of a lean carburetor setting, and no adjustments should be made except idle speed adjustment with the throttle stop screw. The exhaust emission control system is separate from the crankcase emission control system.

California only:
The exhaust emission control system consists of a secondary air supply system which introduces filtered air into the exhaust gases in the exhaust port. No adjustments to this system should be made, although periodic inspection of the components is recommended. The secondary air supply system helps improve emission performance.



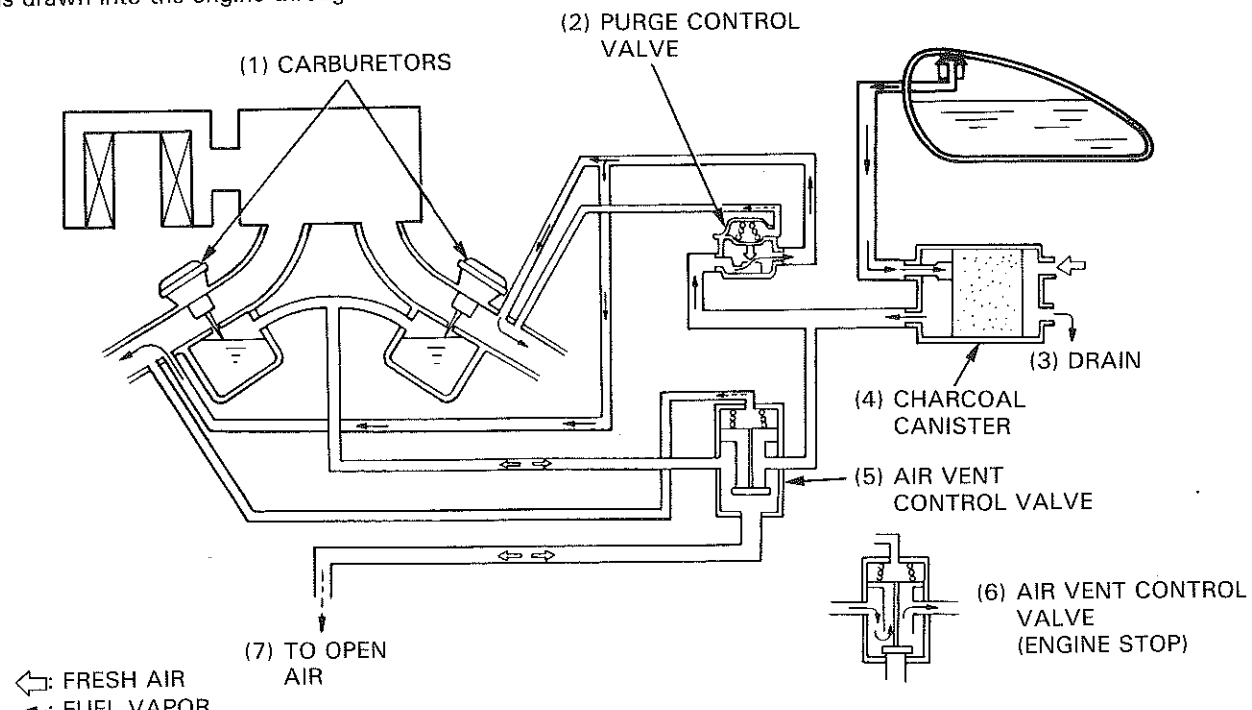
CRANKCASE EMISSION CONTROL SYSTEM

The engine is equipped with a closed crankcase system which routes crankcase emissions through the air cleaner into the combustion chamber.



EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

This model complies with California Air Resources Board evaporative emission requirements.
Fuel vapor from the fuel tank and carburetor is directed into the charcoal canister where it is adsorbed and stored while the engine is stopped. When the engine is running and the purge control diaphragm valve is open, fuel vapor in the charcoal canister is drawn into the engine throught the carburetor.



NOISE EMISSION CONTROL SYSTEM

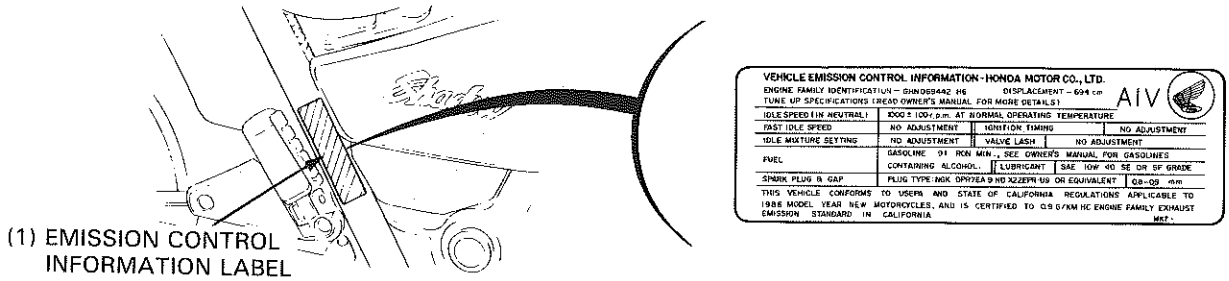
TAMPERING WITH THE NOISE CONTROL SYSTEM IS PROHIBITED: Federal law prohibits the following acts or the causing thereof: (1) The removal or rendering inoperative by any person, other than for purposes of maintenance, repair or replacement, of any device or element of design incorporated into any new vehicle for the purpose of noise control prior to its sale or delivery to the ultimate purchaser or while it is in use; or (2) the use of the vehicle after such device or element of design has been removed or rendered inoperative by any person.

AMONG THOSE ACTS PRESUMED TO CONSTITUTE TAMPERING ARE THE ACTS LISTED BELOW:

1. Removal of, or puncturing of the muffler, baffles, header pipes or any other component which conducts exhaust gases.
2. Removal of, or puncturing of any part of the intake system.
3. Lack of proper maintenance.
4. Replacing any moving parts of the vehicle, or parts of the exhaust or intake system, with parts other than those specified by the manufacturer.

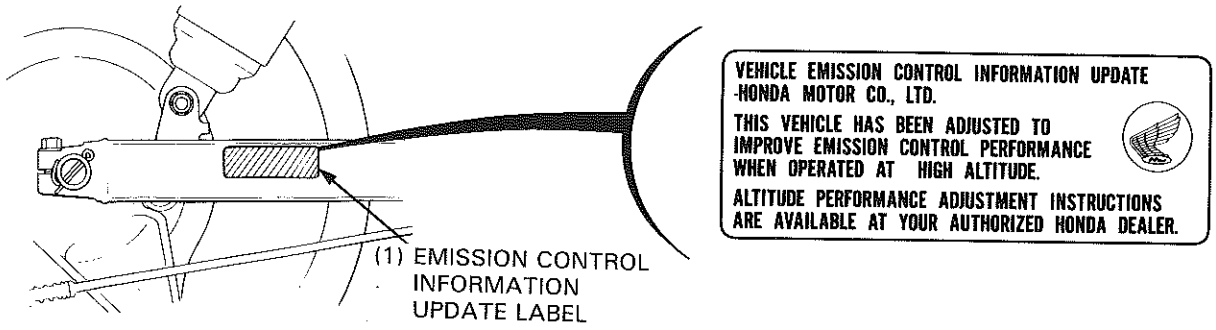
EMISSION CONTROL INFORMATION LABELS

An Emission Control Information Label is located on the right side down pipe as shown. It contains basic tune-up specifications.



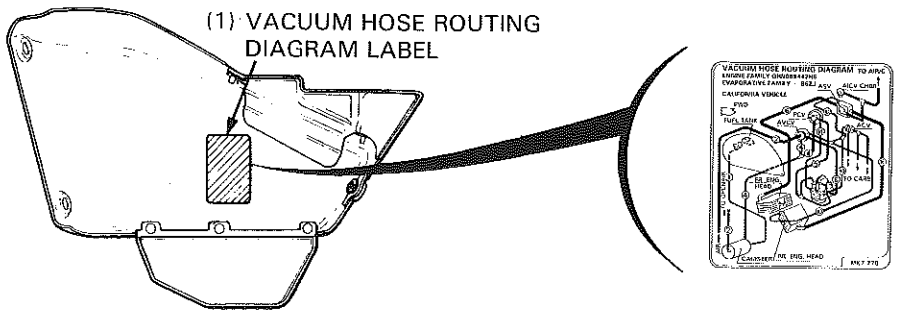
EMISSION CONTROL INFORMATION UPDATE LABEL

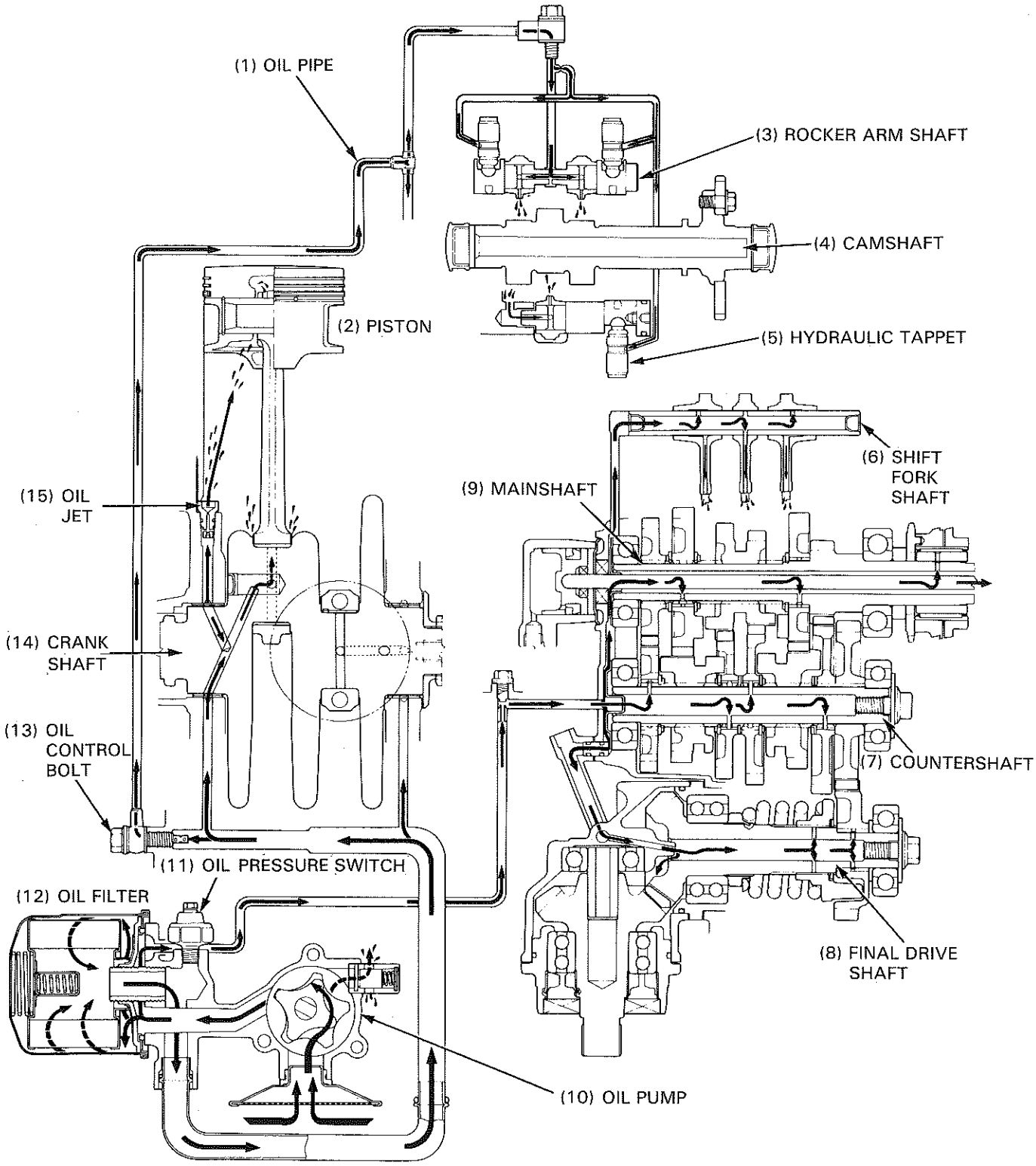
After making a high altitude carburetor adjustment (Page 4-15), attach an update label on the right side of the swingarm. Instructions for obtaining the update label are given in Service Letter No. 132.



VACUUM HOSE ROUTING DIAGRAM LABEL (California model only)

The Vacuum Hose Routing Diagram Label is on the frame right side cover. Route the vacuum hoses as shown on this label.




(1) OIL PIPE
(3) ROCKER ARM SHAFT
(4) CAMSHAFT
(2) PISTON
(5) HYDRAULIC TAPPET
(6) SHIFT FORK SHAFT
(9) MAINSHAFT
(15) OIL JET
(14) CRANK SHAFT
(13) OIL CONTROL BOLT
(7) COUNTERSHAFT
(11) OIL PRESSURE SWITCH
(12) OIL FILTER
(8) FINAL DRIVE SHAFT
(10) OIL PUMP

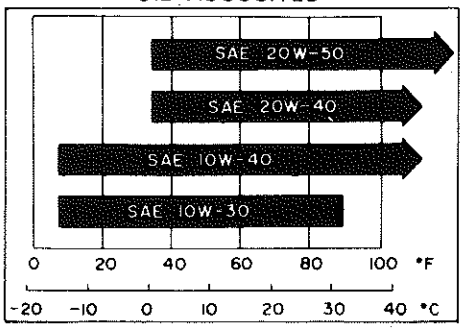
SERVICE INFORMATION

GENERAL

- To remove the oil pump, perform the following:
  - Clutch assembly removal (Section 7).
  - Gearshift linkage removal (Section 9).

SPECIFICATIONS

Engine oil

Oil capacity	3.0 liter (3.2 US qt, 2.6 Imp qt) after draining 3.5 liter (3.7 US qt, 3.1 Imp qt) after disassembly
Oil recommendation	Use Honda 4-Stroke Oil or equivalent. API Service Classification: SE or SF. Viscosity: SAE 10W—40 Other viscosities shown in the chart may be used when the average temperature in your riding area is within the indicated range. OIL VISCOSITES 
Oil pressure (at oil pressure switch)	4.5 kg/cm² (63.99 psi) at 6,000 rpm (80°C/176°F)

Oil pump service data

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Rotor tip clearance	0.15 (0.006)	0.20 (0.008)
Pump body clearance	0.15—0.22 (0.006—0.009)	0.35 (0.014)
Pump end clearance	0.02—0.07 (0.001—0.003)	0.10 (0.004)

Final drive gear oil

Oil capacity	150 cc (5.1 oz) after disassembly 130 cc (4.4 oz) after draining
Recommended oil	Hypoid gear oil: SAE #80

TORQUE VALUES

Engine oil drain plug	30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)	
Engine oil filter	15—20 N·m (1.5—2.0 kg-m, 11—14 ft-lb)	
Oil pressure switch	10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)	—Apply 3-BOND® No. 1211 or its
Oil pump driven sprocket bolt	15—20 N·m (1.5—2.0 kg-m, 11—14 ft-lb)	equivalent to the bolt threads.
Final drive gear case oil filler cap	10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)	

TOOLS

Special

Oil pressure gauge	07506—3000000	
Oil pressure gauge attachment	07510—4220100	or equivalent commercially available in U.S.A.
Oil filter wrench	07912—6110001	

TROUBLESHOOTING

Oil level too low—high oil consumption
- External oil leaks
- Worn piston rings
- Worn valve guide or seal

Oil contamination
- Oil or filter not changed often enough
- Head gasket faulty
- Worn piston rings

Low oil pressure
- Oil level low
- Pressure relief valve stuck open
- Plugged oil pick-up screen
- Oil pump worn
- External oil leaks

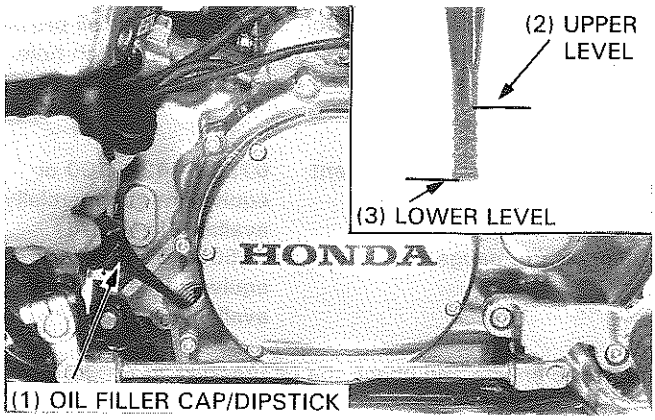
High oil pressure
- Pressure relief valve stuck open
- Plugged oil filter, gallery, or metering orifice
- Incorrect oil being used

No oil pressure
- Oil level low
- Oil pump drive chain broken
- Oil pump faulty
- Internal oil leakage

ENGINE OIL LEVEL

Place the motorcycle on its center stand.
Check the oil level with the filler cap/dipstick.
Do not screw it in when making this check.

If the oil level is below or near the lower level mark on the dipstick, add the recommended oil (page 2-1) up to the upper level mark.



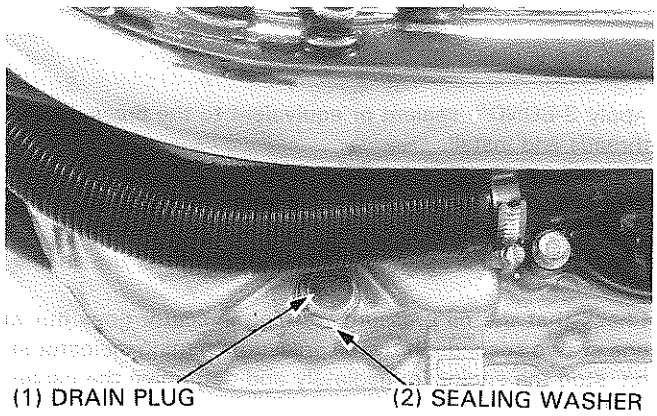
ENGINE OIL & FILTER CHANGE

NOTE

- Change engine oil with the engine warm and the motorcycle on its center stand to assure complete and rapid draining.

Remove the oil filler cap and drain plug and drain the oil.
Remove and discard the oil filter.
Check that the sealing washer on the drain plug is in good condition and install it.

TORQUE: 30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)



Apply oil to the new oil filter O-ring and install the new oil filter.

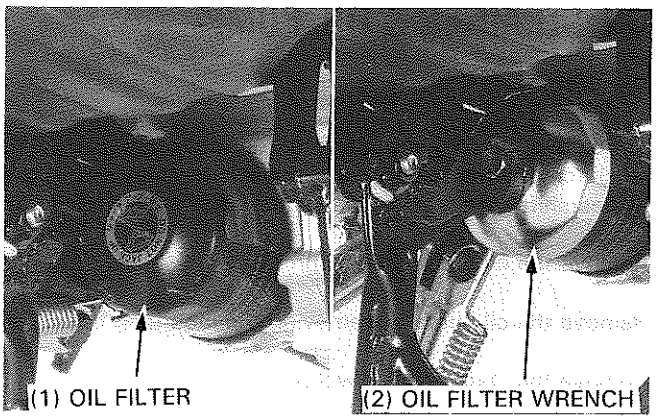
Torque the oil filter with a filter wrench after placing the motorcycle on its side stand.

TOOL: Oil filter wrench 07912—6110001

TORQUE: 15—20 N·m (1.5—2.0 kg-m, 11—14 ft-lb)

After tightening the oil filter, place the motorcycle back on its center stand.
Fill the crankcase with recommended oil (page 2-1).

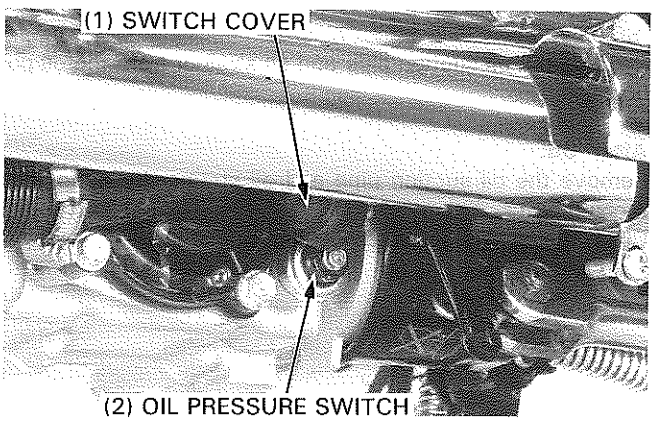
Install the oil filler cap/dipstick.
Start the engine and let it idle for 2—3 minutes.
Stop the engine and check that the oil level is at the upper level mark on the dipstick. Make sure there are no oil leaks.



OIL PRESSURE CHECK

Warm the engine up to normal operating temperature (approximately 80°C/176°F).
Stop the engine.

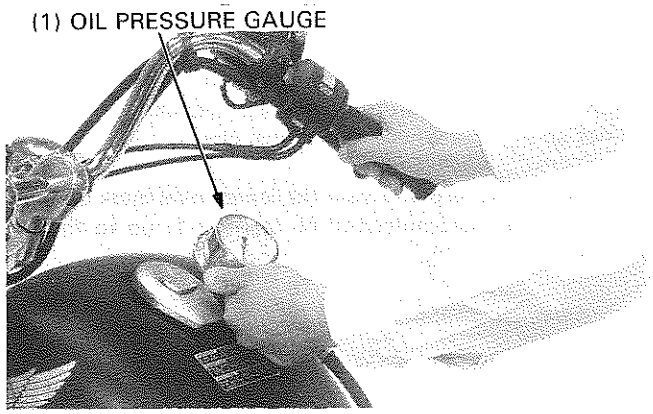
Remove the switch cover and disconnect the oil pressure switch wire.



Remove the oil pressure switch and connect an oil pressure gauge attachment and gauge to the pressure switch hole. Check the oil level.

TOOLS:

Oil pressure gauge attachment	**07510—4220100 or equivalent commercially available in U.S.A.**
Oil pressure gauge	**07506—3000000 or equivalent commercially available in U.S.A.**



Start the engine and check the oil pressure at 6,000 rpm.

OIL PRESSURE:
441 kPa (4.5 kg/cm², 64 psi) at 6,000 rpm (80°C/176°F)

Stop the engine.

Apply 3-BOND® sealant or equivalent to the pressure switch threads and install.

TORQUE: 10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

Connect the oil pressure switch wire and start the engine.

Check that the oil pressure warning indicator goes out after one or two seconds. If the oil pressure warning indicator stays on, stop the engine immediately and determine the cause.

OIL STRAINER & OIL PUMP

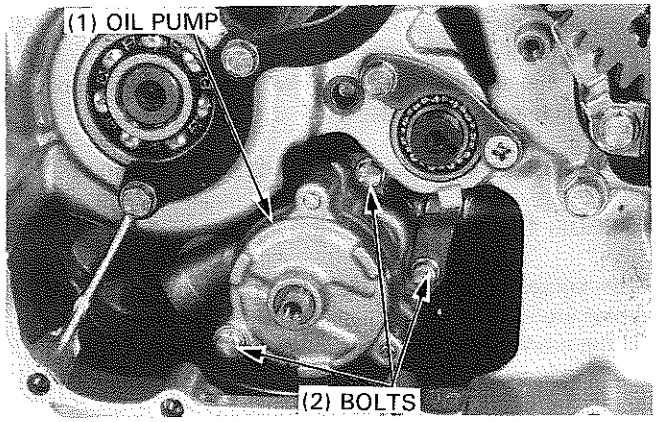
REMOVAL

To remove the oil pump, perform the following:
— clutch assembly removal (section 7).
— gearshift linkage removal (section 9).

Remove the oil pump driven sprocket.

Remove the oil pump by removing the mounting bolts.

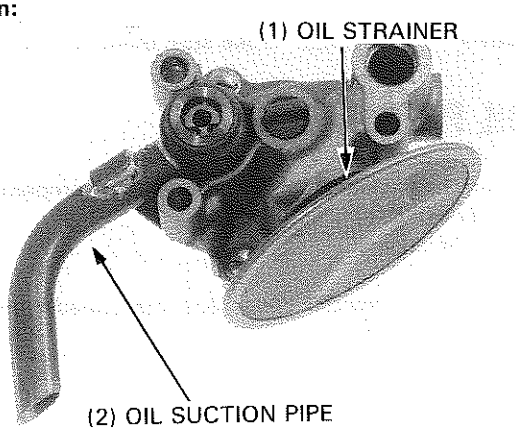
Remove the O-ring and dowel pins.



'86 only:
Remove the oil suction pipe and oil strainer from the oil pump body.

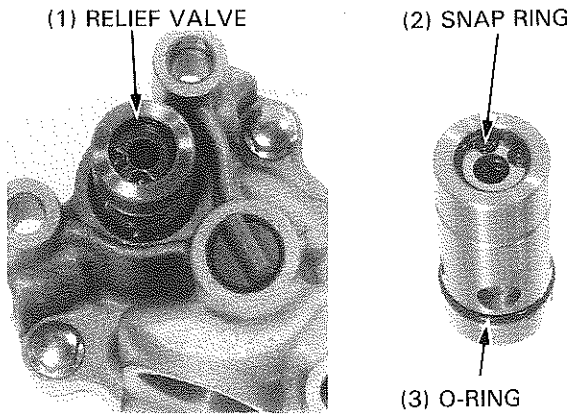
After '86:
Remove the oil suction pipe and oil strainer by removing attaching bolt.
Clean the oil strainer with non flammable solvent.

'86 shown:

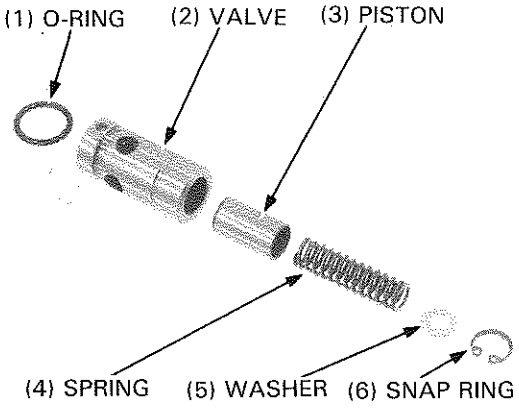


RELIEF VALVE CHECK

Remove the following:
— relief valve from the oil pump.
— O-ring from the relief valve.
— relief valve snap ring.
Disassemble the relief valve.

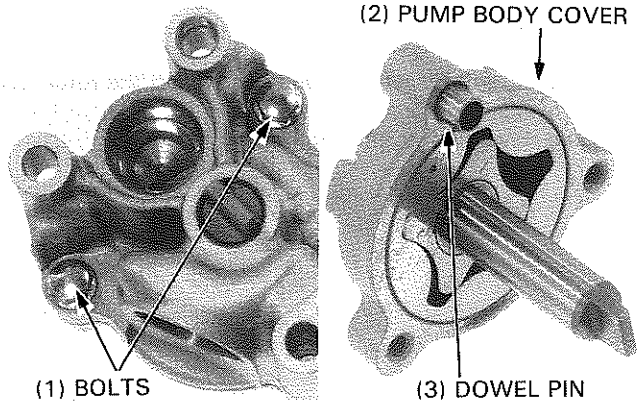


Check the spring and piston for wear or damage.
Check the valve for clogging or damage.
Assemble the parts in the reverse order of disassembly. Be sure to use a new O-ring.



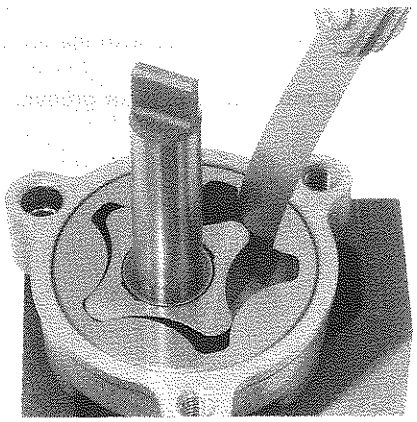
OIL PUMP DISASSEMBLY

Remove the oil pump body cover and remove the dowel pin.



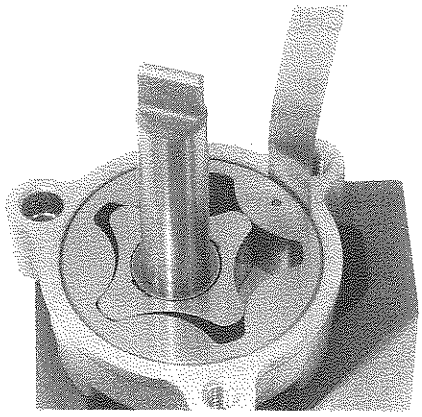
Measure the rotor tip clearance.

SERVICE LIMIT: 0.20 mm (0.008 in)



Measure the pump body clearance.

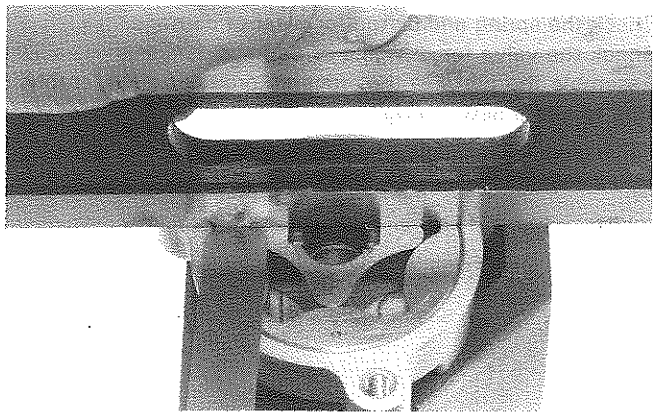
SERVICE LIMIT: 0.35 mm (0.014 in)



Remove the spacer and drive pin from the rotor shaft.

Remove the rotor shaft and measure the pump end clearance.

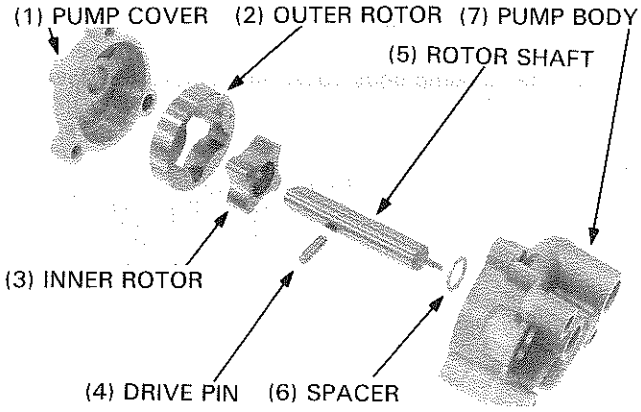
SERVICE LIMIT: 0.10 mm (0.004 in)



ASSEMBLY

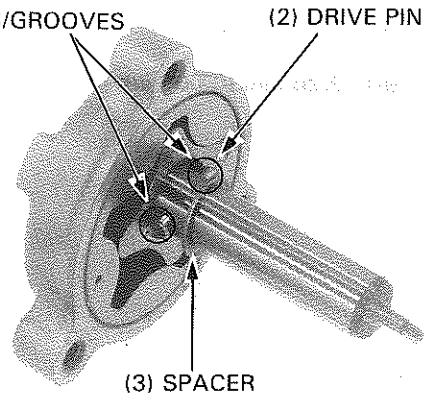
Install the outer rotor into the body and insert the rotor shaft.

Insert the drive pin into the rotor shaft.



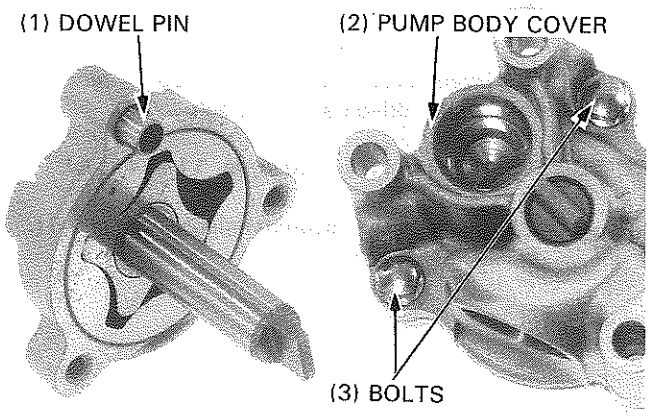
Align the slots in the inner rotor with the drive pin.

Place the spacer into the inner rotor groove.

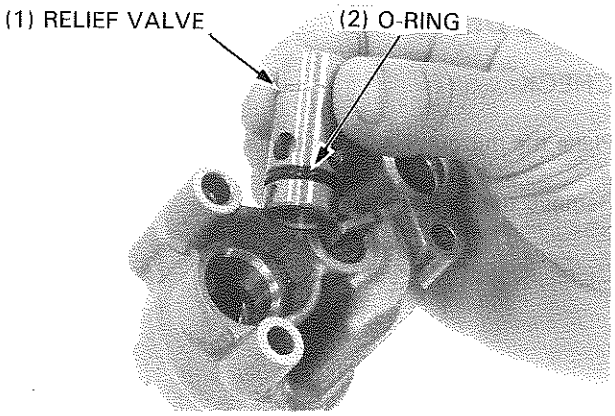


Install the dowel pin and oil pump body cover.

Make sure the rotor shaft is rotating smoothly.



Install the relief valve with a new O-ring into the oil pump body.

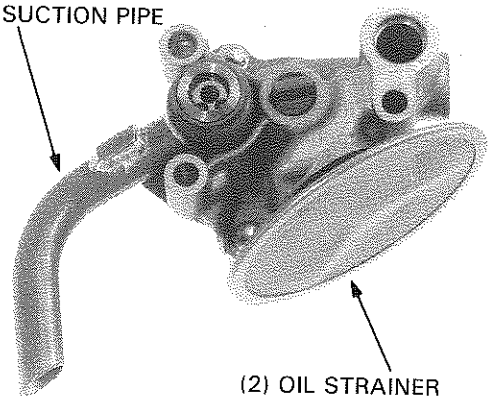


Install a new O-ring into the oil strainer hole.

'86 only:
Install the oil strainer into the oil pump.

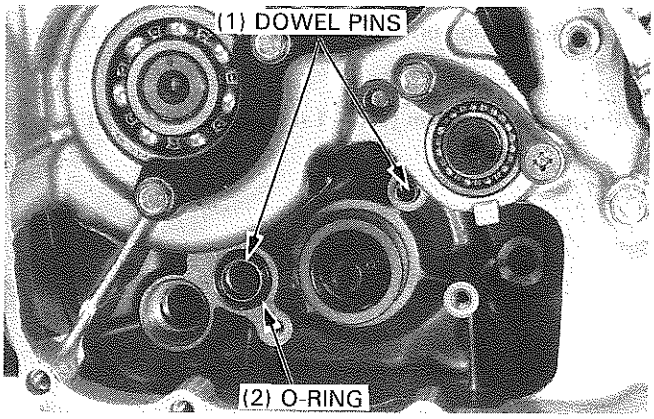
After '86:
Install the oil strainer into the oil pump by attaching bolt.
Install the oil suction pipe over the relief valve.

'86 shown:



INSTALLATION

Install the dowel pins and an O-ring.
Align the lug of the oil pump shaft with the groove in the water pump shaft and install the oil pump to the right crankcase.

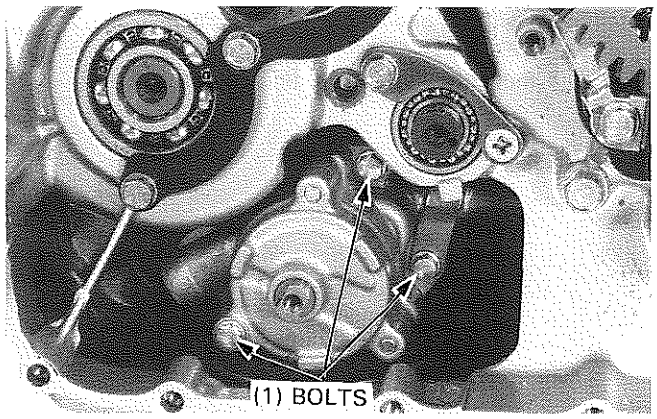


Tighten the mounting bolts.

Install the removed parts in the reverse order of removal. Tighten the oil pump driven sprocket bolt.

TORQUE: 15—20 N·m (1.5—2.0 kg-m, 11—14 ft-lb)

Fill the crankcase with the recommended oil (page 2-1).

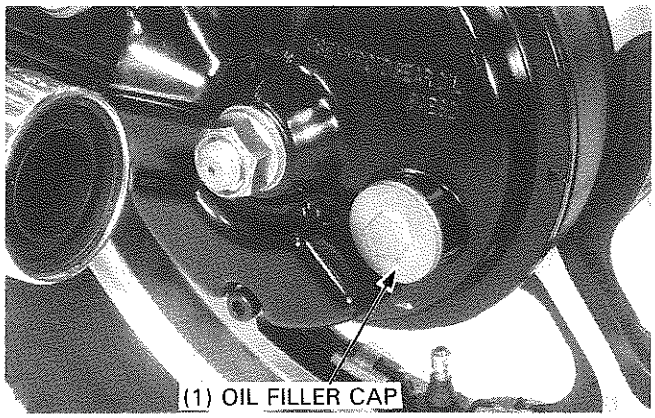


FINAL DRIVE OIL

CHECK

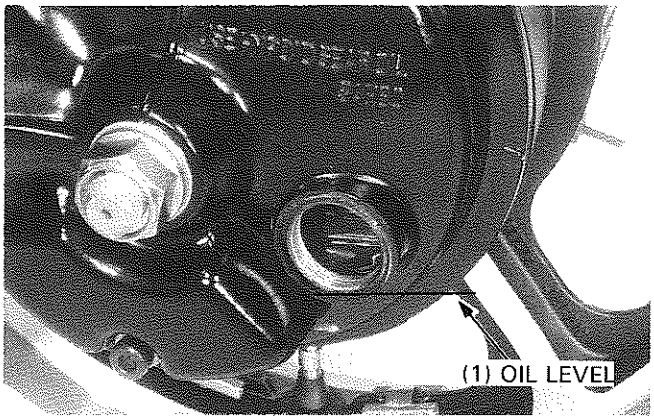
Place the motorcycle on its center stand on level ground.

Remove the oil filler cap.



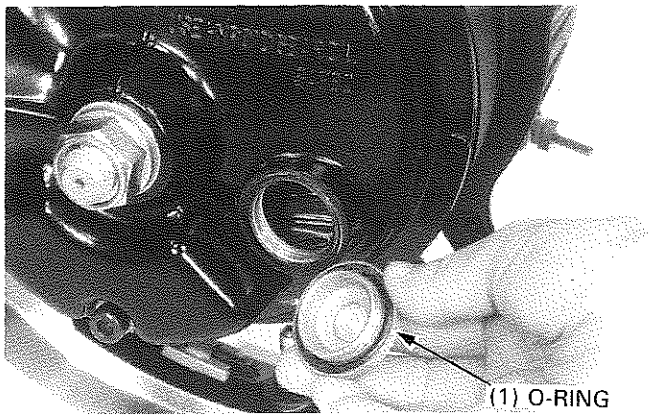
Check that the oil level reaches the lower edge of the oil filler cap hole.

Check for leaks, if the level is low. Pour fresh oil through the oil filler hole until it reaches the lower edge.



Install a new O-ring on the filler cap, and install and tighten the cap.

TORQUE: 10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)



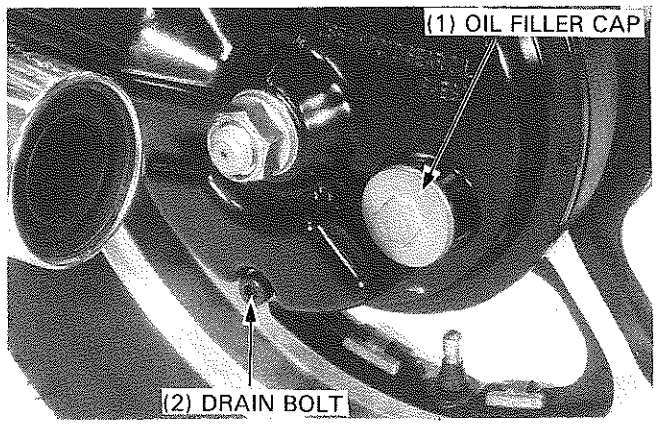
CHANGE

Remove the oil filler cap and drain bolt to drain all oil from the final gear case.
Install and tighten the drain bolt.

TORQUE: 10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

Fill the gear case with the recommended oil up to the correct level.

OIL CAPACITY: 130 cc (4.4 oz) after draining
RECOMMENDED OIL: HYPOID GEAR OIL SAE # 80

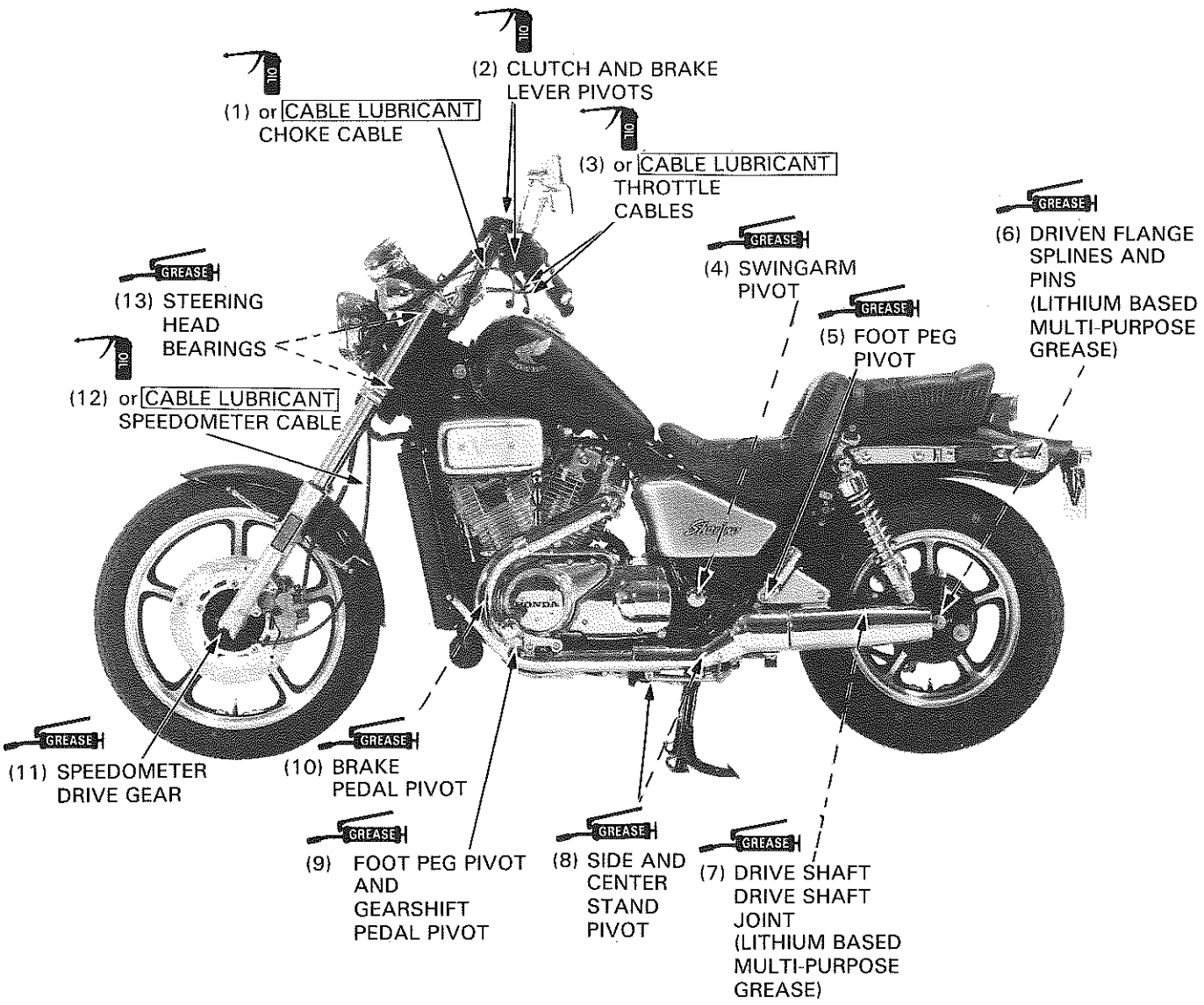


CONTROL CABLE LUBRICATION

Periodically, disconnect the throttle cables at their upper ends. Thoroughly lubricate the cables and their pivot points with a commercially available cable lubricant or a light weight oil.

LUBRICATION POINTS

'86 shown:



SERVICE INFORMATION

GENERAL

Engine oil	See page 2-3
Engine oil filter	See page 2-3
Final drive oil	See page 2-8

WARNING

- *Support the motorcycle on the center stand on a level surface before starting any work.*
- *When the engine must be running to do some work, make sure the area is well ventilated. Never run the engine in a closed area. The exhaust contains poisonous carbon monoxide gas.*

SPECIFICATIONS

Throttle grip free play:	2—6 mm (1/8—1/4 in)
Choke valve stroke:	10—11 mm (0.39 ± 0.43 in)
Spark plugs:	

Standard		For cold climate (below 5°C, 41°F)		For extended high speed riding	
NGK	ND	NGK	ND	NGK	ND
DPR7EA-9	X22EPR-U9	DPR6EA-9	X20EPR-U9	DPR8EA-9	X24EPR-U9

Spark plug gap: 0.8—0.9 mm(0.031—0.035 in)

Carburetor synchronization:	Both carburetors within 40 mm (1.6 in) Hg of each other
Idle speed:	1,000 ± 100 rpm 1,100 ± 100 rpm (California)
Cylinder compression:	13 ± 2 kg/cm² (185 ± 28 psi)
Brake pedal height:	35 mm (1-1/3 in)
Brake pedal free play:	20—30 mm (3/4—1-1/4 in)
Front fork air pressure:	0—6 psi (0—40 kPa, 0—0.4 kg/cm²)
Tire:	

		Front	Rear
Tire size		100/90—19 57H	140/90—15 70H
Cold tire pressure psi (kg/cm², kPa)	UP to 90 kg (200 lbs) load	32 (2.25, 225)	32 (2.25, 225)
	90 kg (200 lbs) load to vehicle capacity load	32 (2.25, 225)	40 (2.80, 280)
Tire brand	DUNLOP	F11	K627
	BRIDGESTONE	L303	G508

Minimum tire tread depth: Front: 1.5 mm (1/16 in)
Rear: 2.0 mm (3/32 in)

TORQUE VALUE

Spark plug 12—16 N·m (1.2—1.6 kg-m, 9—12 ft-lb)

TOOLS

Vacuum gauge 07404—0030000 or M937B—021—XXXXX (U.S.A. only)
Pilot screw wrench 07908—4220201

MAINTENANCE SCHEDULE

Perform the PRE-RIDE INSPECTION in the Owner's Manual at each scheduled maintenance period.
I: Inspect and clean, Adjust, Lubricate, or Replace if necessary.
R: Replace

		ITEM / FREQUENCY	WHICHEVER COMES FIRST — EVERY	ODOMETER READING (NOTE 3) 600 mi (1,000 km)	4,000 mi (6,400 km)	8,000 mi (12,800 km)	12,000 mi (19,200 km)	16,000 mi (25,600 km)	20,000 mi (32,000 km)	24,000 mi (38,400 km)	Refer to page
EMISSION RELATED ITEMS	*	FUEL LINES				I		I		I	3-4
	*	FUEL FILTER	NOTE 4							R	3-4
	*	THROTTLE OPERATION				I		I		I	3-5
	*	CARBURETOR-CHOKE				I		I		I	3-6
		AIR CLEANER	NOTE 1				R			R	3-7
		SPARK PLUGS			R	R	R	R	R	R	3-7
		ENGINE OIL		R		R		R		R	2-3
		ENGINE OIL FILTER		R		R		R		R	2-3
	*	CARBURETOR-SYNCHRONIZATION		I		I		I		I	3-8
	*	CARBURETOR-IDLE SPEED		I	I	I	I	I	I	I	3-8
		RADIATOR COOLANT	2 YEARS *R			I		I		*R	3-9
	*	COOLING SYSTEM				I		I		I	3-9
	*	SECONDARY AIR SUPPLY SYSTEM	NOTE 2			I		I		I	3-10
	*	EVAPORATIVE EMISSION CONTROL SYSTEM	NOTE 2				I			I	3-10
NON-EMISSION RELATED ITEMS		FINAL DRIVE OIL				I		I		R	2-8
		BATTERY			I	I	I	I	I	I	3-11
		BRAKE FLUID (FRONT)	2 YEARS *R		I	I	*R	I	I	*R	3-11
		BRAKE SHOE/PAD WEAR			I	I	I	I	I	I	3-12
		BRAKE SYSTEM		I		I		I		I	3-12
	*	BRAKE LIGHT SWITCH				I		I		I	3-13
	*	HEADLIGHT AIM				I		I		I	3-13
		CLUTCH SYSTEM				I		I		I	3-14
		CLUTCH FLUID	2 YEARS *R		I	I	*R	I	I	*R	3-14
		SIDE STAND				I		I		I	3-14
	*	SUSPENSION				I		I		I	3-15
	*	NUTS, BOLTS, FASTENERS		I		I		I		I	3-15
	**	WHEELS/TIRES				I		I		I	3-15
	**	STEERING HEAD BEARINGS		I		I		I		I	3-16

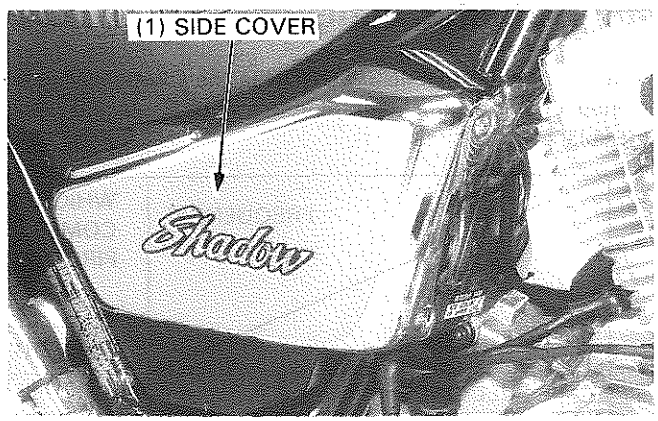
* Should be serviced by an authorized Honda dealer, unless the owner has proper tools and service data and is mechanically qualified.
** In the interest of safety, we recommend these items be serviced only by an authorized Honda dealer.

NOTES: 1. Service more frequently when riding in dusty areas.
2. California model only.
3. For higher odometer readings, repeat at the frequency interval established here.
4. Applicable to '86 model only.

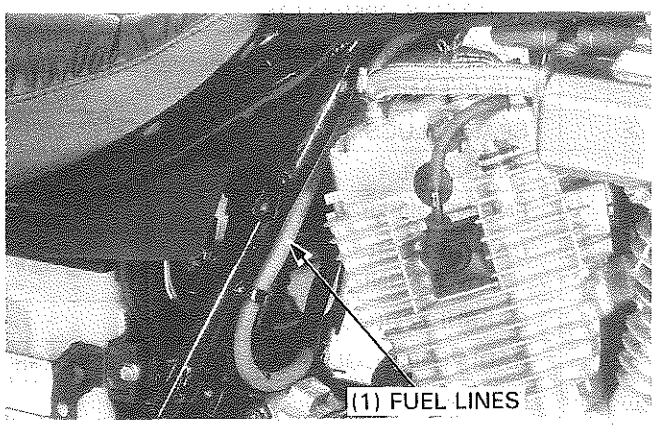
FUEL LINES

Remove the right and left side covers, and frame center cover.

Remove the spark unit base (page 19-13).



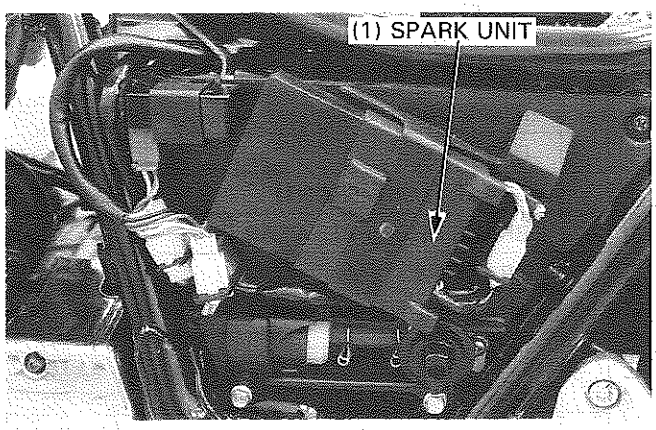
Check the fuel lines for deterioration, damage or leakage.
Replace the fuel lines if necessary.



FUEL FILTER

Remove the left side cover.
Turn the fuel valve off.

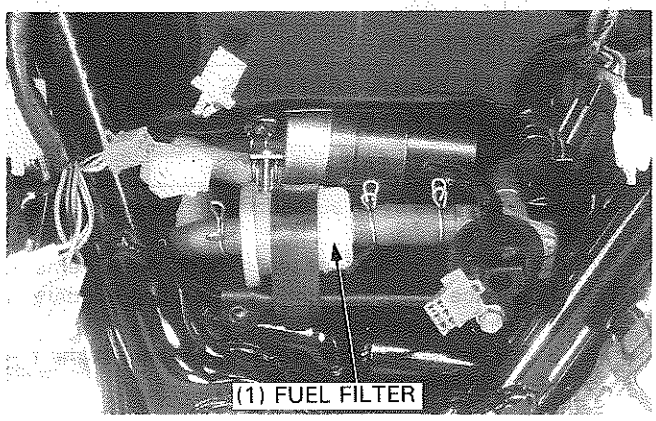
Disconnect the couplers and remove the spark unit base by removing the bolts and screw.



Disconnect the fuel tubes from the fuel filter and remove the fuel filter.
Replace the fuel filter as indicated by the maintenance schedule (page 3-3).

WARNING

- ***Gasoline is flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in your working area.***



THROTTLE OPERATION

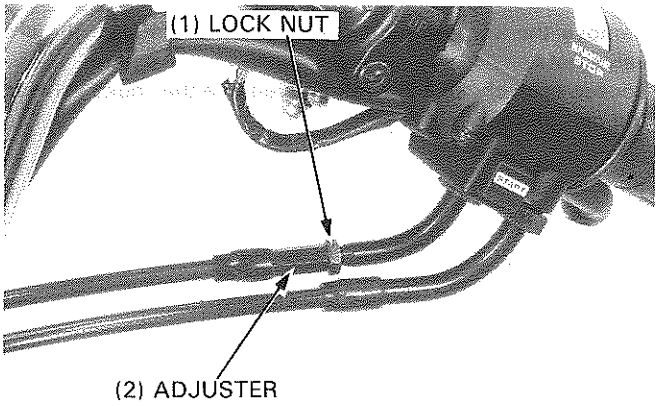
Check the throttle grip for smooth operation: complete opening and automatic closing in all steering positions.

Make sure there is no deterioration, damage, or kinking in the throttle cables. Replace any damaged parts.
Lubricate the throttle cables (page 2-9) if throttle operation is not smooth.

Measure throttle grip free play at the throttle grip flange.

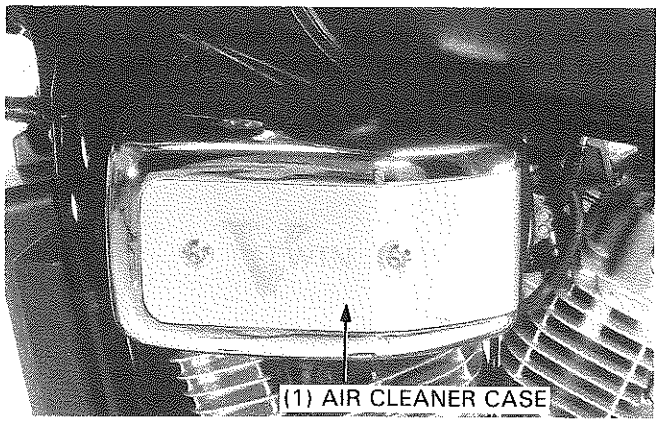
FREE PLAY: 2—6 mm (1/8—1/4 in)

Throttle grip free play can be adjusted at either end of the throttle cable. Minor adjustments are made with the upper adjuster.

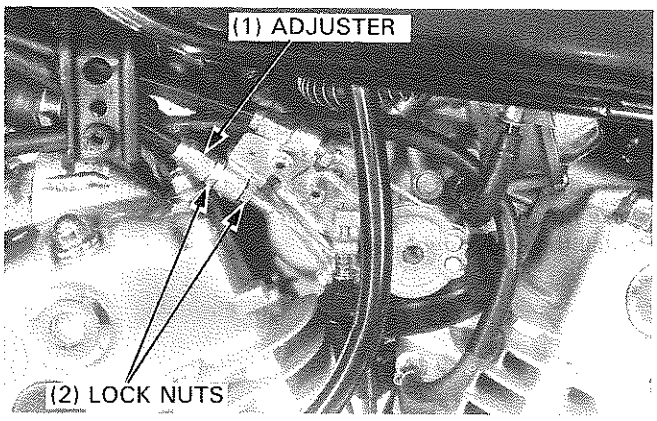


Major adjustments are made with the lower adjuster.

Remove the air cleaner case by removing the two air cleaner case mounting bolts and loosening the air cleaner connecting tube band screw.



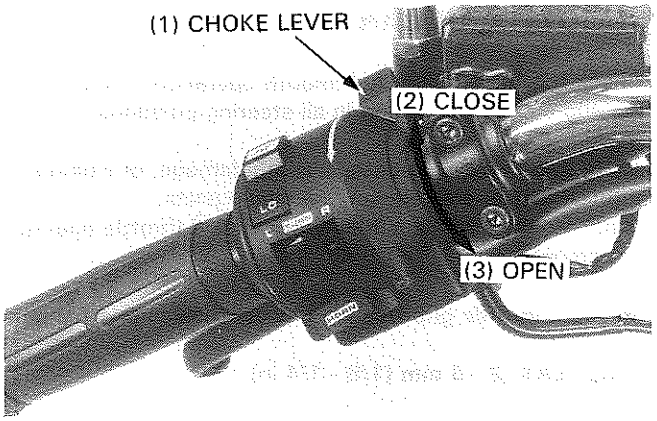
Adjust the free play by loosening the lock nut and turning the adjuster.
Tighten the lock nut.
Recheck the throttle free play.



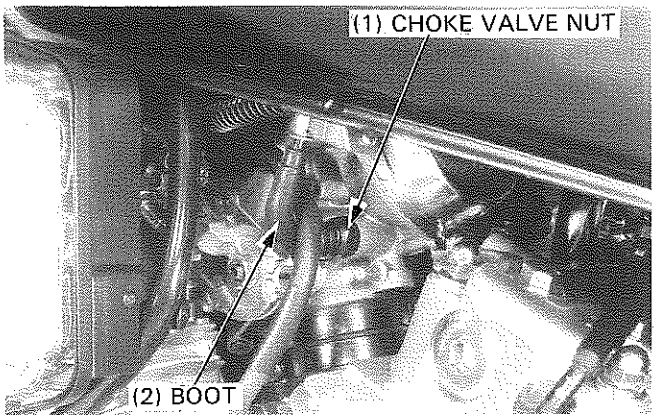
CARBURETOR CHOKE

This model's choke system uses a fuel enrichening circuit controlled by a choke valve. The choke valve opens the enrichening circuit via a cable when the choke lever on the handlebar is pulled back.

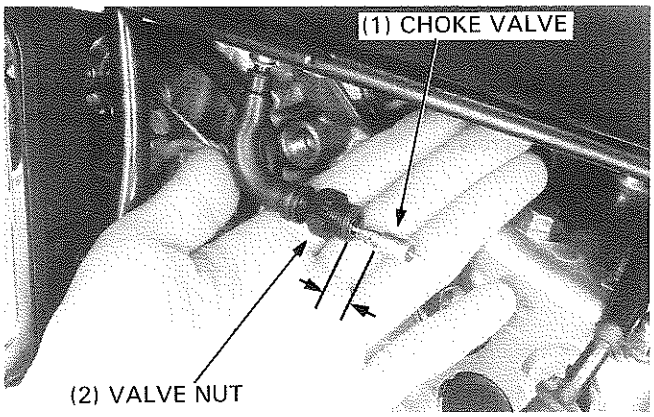
Check for smooth upper choke lever operation. Lubricate the choke cable if the operation is not smooth.



Remove the left and right choke cable boots from the choke valve nuts.
Loosen each choke valve nut and remove the choke valve from the carburetor.

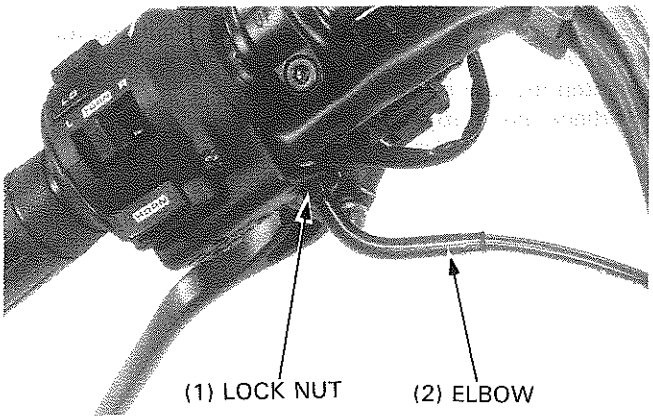


Push the choke lever on the handlebar all the way up to fully closed and measure the distance between the ends of the choke valve and nut.
It should be 10—11 mm (0.39—0.43 in).



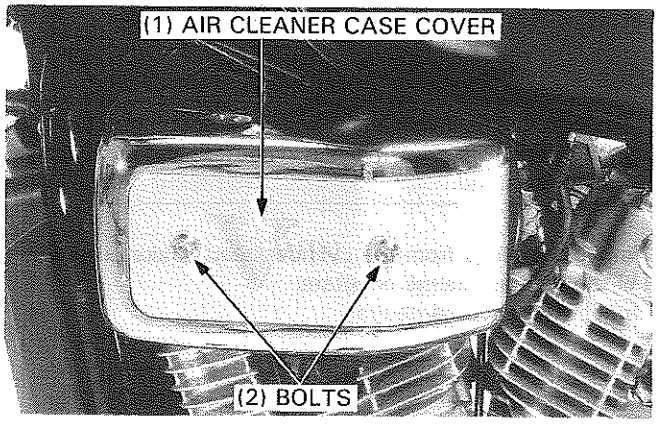
Adjust the distance to within specifications by loosening the lock nut and turning the cable's elbow at the left handlebar switch housing.
Tighten the lock nut securely and recheck the distance.

Thread the choke valve in by hand and then tighten the choke valve nut 1/4 turn with a 14 mm wrench.
Install the choke cable boots.

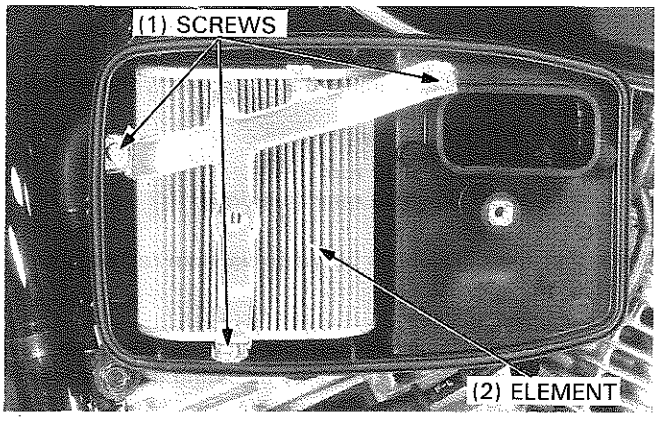


AIR CLEANER

Remove the two bolts attaching the air cleaner case cover.



Remove the three screws attaching the element, and remove the element from the air cleaner case.
Replace the element in accordance with the maintenance schedule or any time it is excessively dirty or damaged.
Install the air cleaner element in the reverse order of removal.



SPARK PLUGS

RECOMMENDED SPARK PLUGS

	NGK	ND
Standard	DPR7EA-9	X22EPR-U9
For cold climate (Below 5°C, 41°F)	DPR6EA-9	X20EPR-U9
For extended high speed riding	DPR8EA-9	X24EPR-U9

Disconnect the spark plug caps and clean away any dirt from around the spark plug bases.

Remove and discard the spark plugs.

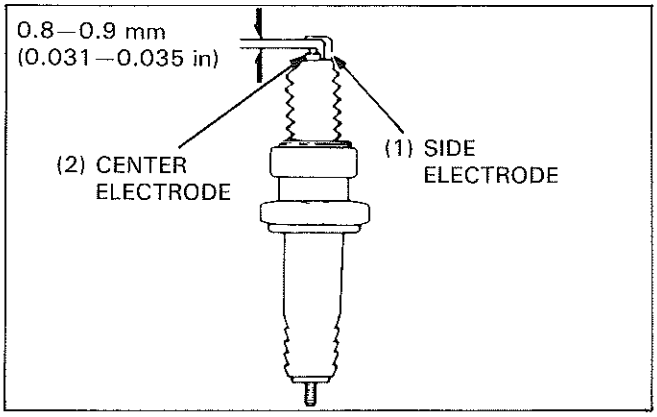
Measure the new spark plug gaps using a wire-type feeler gauge.

SPARK PLUG GAP: 0.8—0.9 mm (0.031—0.035 in)

Adjust the gap by bending the side electrode carefully and install the plugs.

TORQUE: 12—16 N·m (1.2—1.6 kg-m, 9—12 ft-lb)

Connect the spark plug caps.



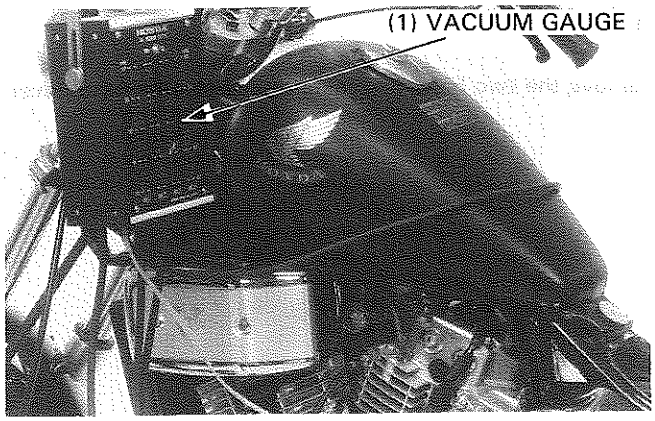
CARBURETOR SYNCHRONIZATION

NOTE

- Perform this maintenance with the engine at normal operating temperature, transmission in neutral, and motorcycle on its center stand.

Remove the plugs from the cylinder head intake ports and install the vacuum gauge adapters.
Connect the vacuum gauge.

TOOL:
Vacuum gauge — **07404—0030000 or M937B—021—XXXXX (U.S.A. only)**

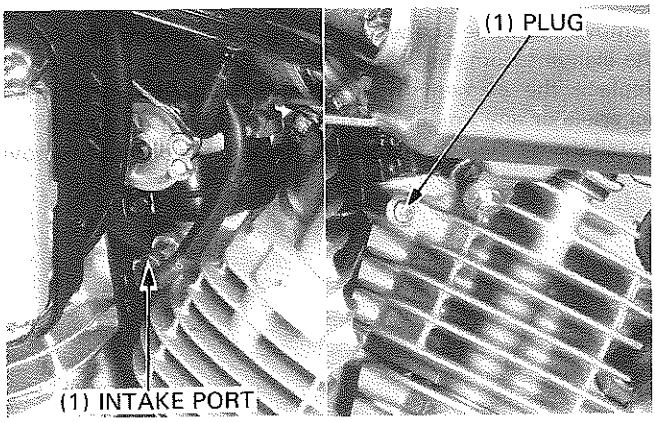


Warm up the engine and adjust the idle speed with the throttle stop screw.

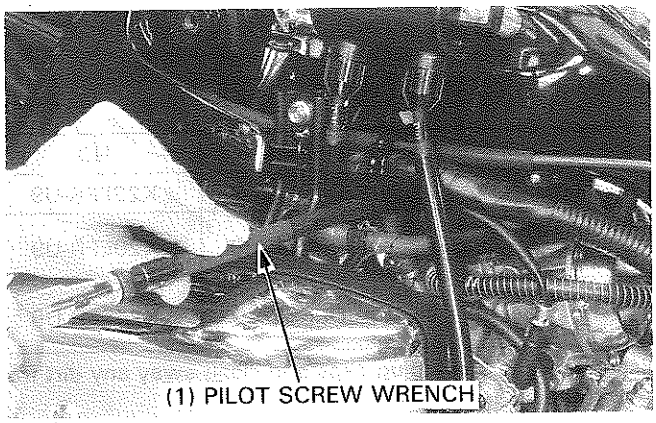
IDLE SPEED: 1,000 ± 100 rpm
1,100 ± 100 rpm: California

Check that the differences between vacuum readings are 40 mm (1.6 in) Hg or less.

If the vacuum readings between carburetors are greater than specified, correct the difference by adjusting the synchronization screw on the No.2 carburetor. The No.1 carburetor cannot be adjusted.



TOOL:
Pilot screw wrench — **07908—4220201**



Recheck the idle speed and synchronization.

Remove the vacuum gauge and adapters from the intake ports.

Install the removed parts in the reverse order of removal.

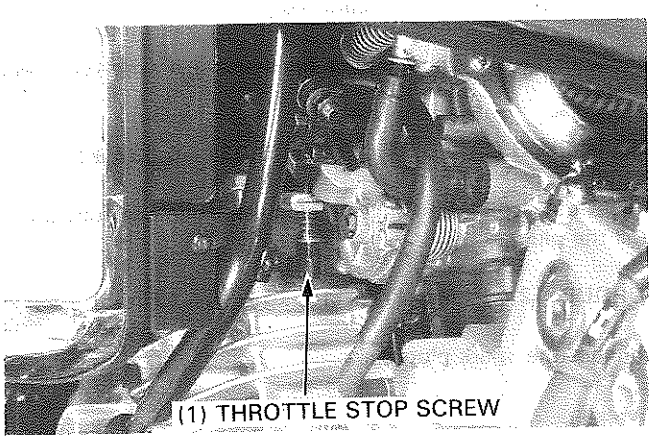
CARBURETOR IDLE SPEED

NOTE

- Inspect and adjust idle speed after all other engine adjustments are within specifications.
- The engine must be warm for accurate adjustment. Ten minutes of stop-and-go riding is sufficient.

Warm up the engine.
Place the motorcycle on its center stand and shift the transmission into neutral.
Check the idle speed and adjust by turning the throttle stop screw if necessary.

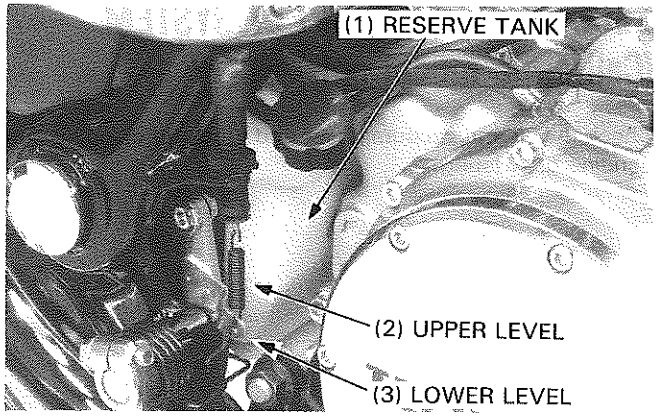
IDLE SPEED: 1,000 ± 100 rpm
1,100 ± 100 rpm: California



RADIATOR COOLANT

Check the coolant level of the reserve tank with the engine running at normal operating temperature. The level should be between the "UPPER" and "LOWER" level lines.

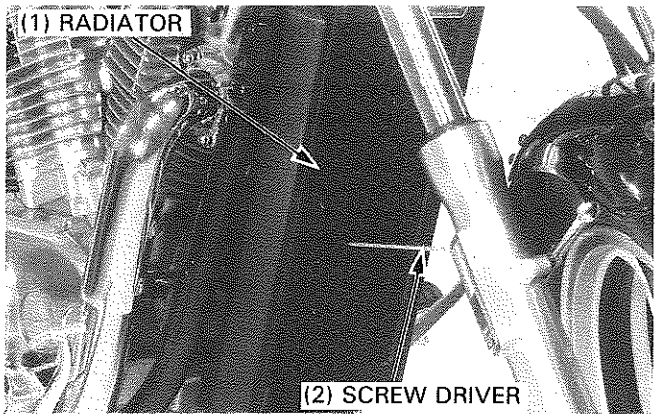
If necessary, remove the reserve tank cap and fill to the "UPPER" level line with a 50/50 mixture of distilled water and anti-freeze.



COOLING SYSTEM

Check the air passages for clogging or damage.
Straighten bent fins or collapsed core tubes and remove insects, mud or any obstructions with compressed air or low water pressure.
Replace the radiator if the air flow is restricted over more than 20% of the radiating surface.
For radiator replacement, refer to page 6-6.

Make sure the hoses are in good condition; they should not show any signs of deterioration.
Replace any hose that shows any sign of deterioration.
Check that all hose clamps are tight.



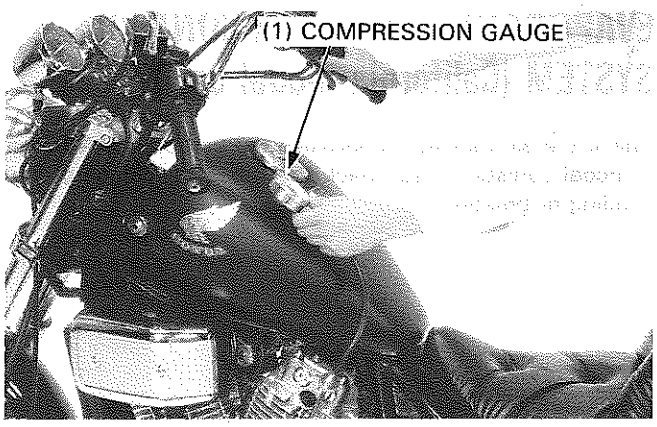
CYLINDER COMPRESSION

Warm up the engine to normal operating temperature.

Stop the engine, disconnect both spark plug caps and remove one spark plug at a time.

NOTE

- To measure the cylinder compression of each cylinder, remove only one plug at a time.



Turn the engine stop switch OFF.

Insert the compression gauge. Open the throttle all the way and crank the engine with the starter motor. Crank the engine until the gauge reading stops rising. The maximum reading is usually reached wthin 4-7 seconds.

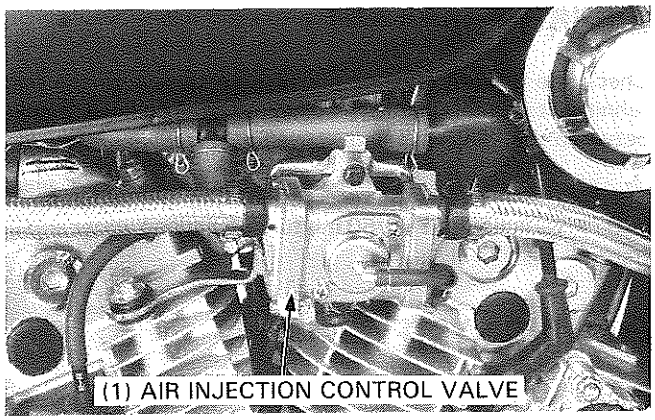
COMPRESSION PRESSURE:
1,275 ± 196 kPa (13.0 ± 2.0 kg/cm², 185 ± 28 psi)

If compression is high, it indicates that carbon deposits have accumulated on the combustion chamber and/or the piston crown.

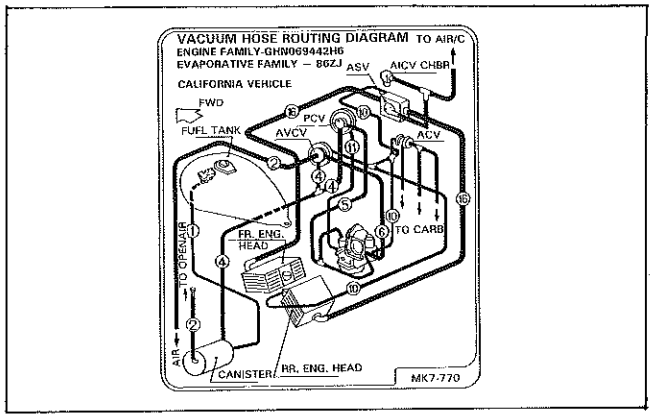
If compression is low, pour 3—5 cc (0.1—0.2 oz) of clean engine oil into the cylinder through the spark plug hole and re-check the compression.
If the compression increases from the previous value, check the cylinder, piston and piston rings.
If compression is the same as the previous value, check the valves for leakage.

SECONDARY AIR SUPPLY SYSTEM (California model only)

Check the air and vacuum hoses and tubes for clogging due to bending or twisting.

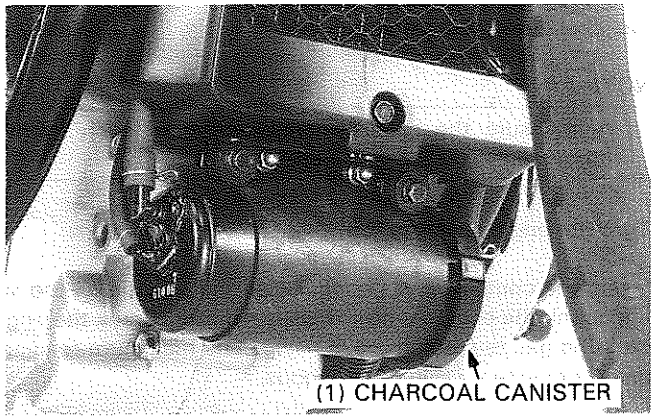


Check the system hoses and tubes for damage, deterioration, clogging or loose connections.
Check the air injection control valve for damage (page 4-16).
Refer to the vacuum hose routing diagram label for hose connections.



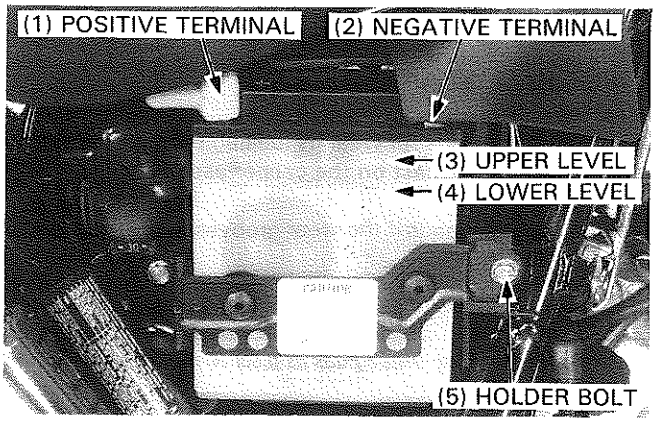
EVAPORATIVE EMISSION CONTROL SYSTEM (California model only)

Check the air vent tubes between the carburetor, AVCV and charcoal canister. Also check the tubes for clogging due to bending or twisting.



Check the system hoses for damage, deterioration, clogging or loose connections.
Check the charcoal canister for cracks or damage.
Refer to the vacuum hose routing diagram label for hose connections.

BATTERY



Remove the right side cover and inspect the battery electrolyte level.
When the level nears the lower level, remove the battery holder bolt and open the holder.
Disconnect the negative cable first, then disconnect the positive cable.
Disconnect the battery breather tube.
Pull the battery out, then remove the filler caps and add distilled water to the upper level line.

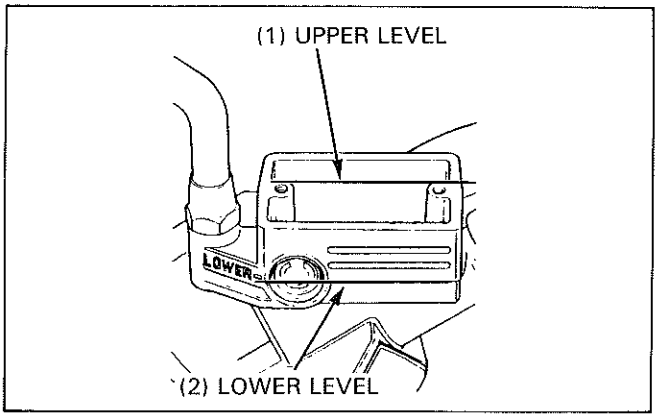
NOTE

- Add only distilled water. Tap water will shorten the service life of the battery.

WARNING

- ***The battery electrolyte contains sulphuric acid. Protect your eyes, skin, and clothing.***
- ***If electrolyte gets in your eyes; flush them thoroughly with water and get prompt medical attention.***

BRAKE FLUID



Check the front brake fluid through the sight glass; if the level is visible, remove the cover, set plate and diaphragm. Fill the reservoir to the upper level with DOT 3 or 4 fluid from a sealed container. Check the system for leaks.

CAUTION

- *Do not remove the reservoir cover until the handlebar has been turned so that the reservoir is level.*
- *Do not mix different types of fluid, as they are not compatible with each other.*
- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Avoid spilling the fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

Refer to section 17 for brake bleeding procedures.

BRAKE SHOE/PAD WEAR

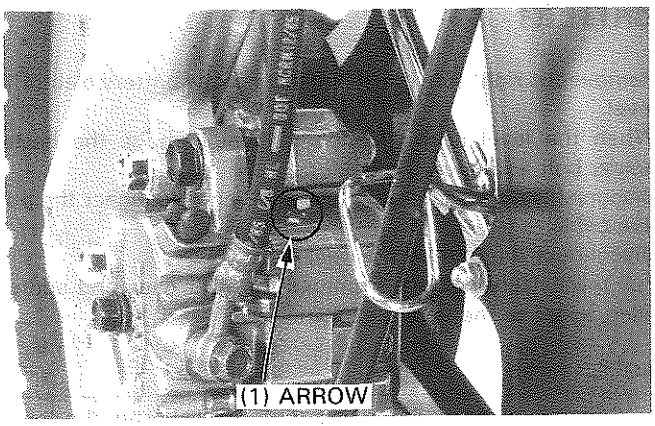
BRAKE PAD WEAR

Check the brake pads for wear by looking through the slot indicated by the arrow cast on the caliper assembly.

Replace the brake pads if the wear grooves in the pads are visible (page 17-4).

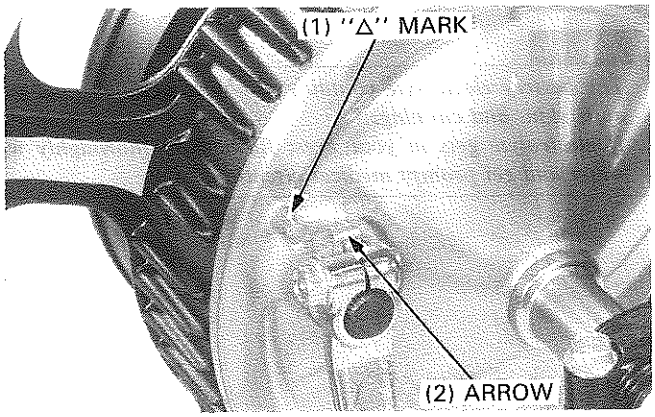
CAUTION

- *Always replace the brake pads as a set to assure even disc pressure.*



BRAKE SHOE INSPECTION

Replace the brake shoes if the arrow on the brake arm aligns with the reference mark "△" on full application of the rear brake pedal.

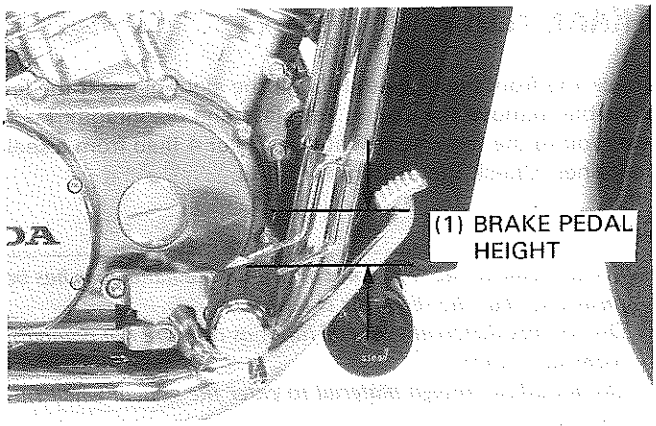


BRAKE SYSTEM

Inspect the brake hoses and fittings for deterioration, cracks and signs of leakage. Tighten any loose fittings.
Replace hoses and fittings as required.

BRAKE PEDAL HEIGHT

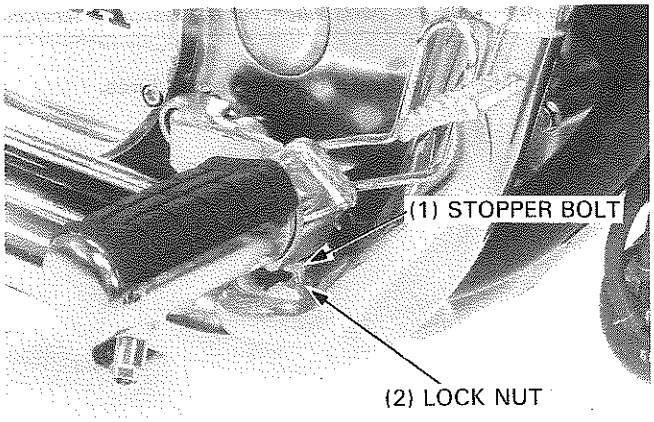
Adjust brake pedal so that the pedal height is 35 mm (1-1/3 in) above the top of the footpeg.



To Adjust:
Loosen the stopper bolt lock nut and turn the stopper bolt.
Retighten the lock nut.

NOTE

- After adjusting the brake pedal height, check the rear brake light switch and brake pedal free play and adjust if necessary.



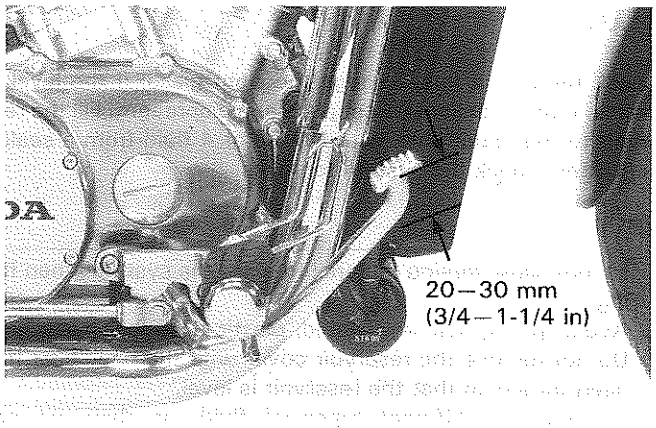
BRAKE PEDAL FREE PLAY

NOTE

- Perform brake pedal free play adjustment after adjusting brake pedal height.

Check the brake pedal free play.

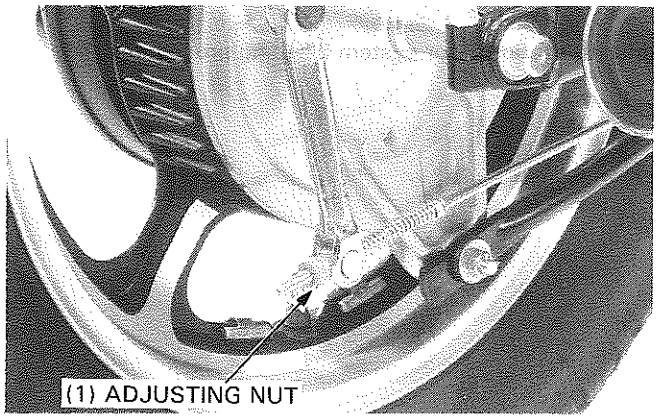
FREE PLAY: 20—30 mm (3/4—1-1/4 in)



If adjustment is necessary, use the rear brake adjusting nut.

NOTE

- After adjusting the brake pedal free play, check the rear brake light switch operation and adjust if necessary.

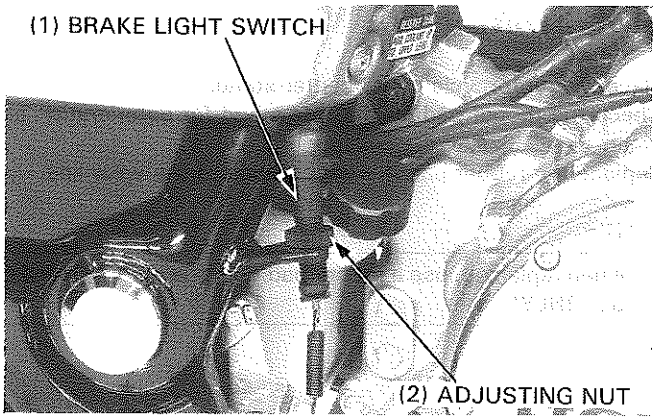


BRAKE LIGHT SWITCH

NOTE

- Perform rear brake light switch adjustment after adjusting the brake pedal play and height.
- The front brake light switch does not require adjustment.

Adjust the brake light switch so that the brake light will come on when the brake pedal is depressed 20 mm (3/4 in), and brake engagement begins. Hold the switch body and turn the adjusting nut. Do not turn the switch body.



HEADLIGHT ADJUSTMENT

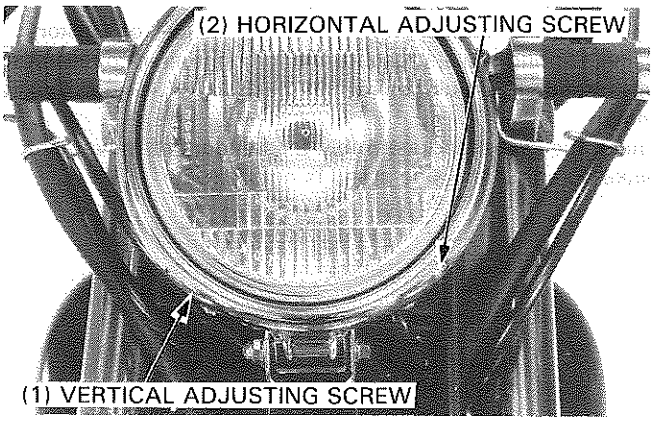
Adjust vertically by turning the vertical adjustment screw.
Adjust horizontally by turning the horizontal adjusting screw.

NOTE

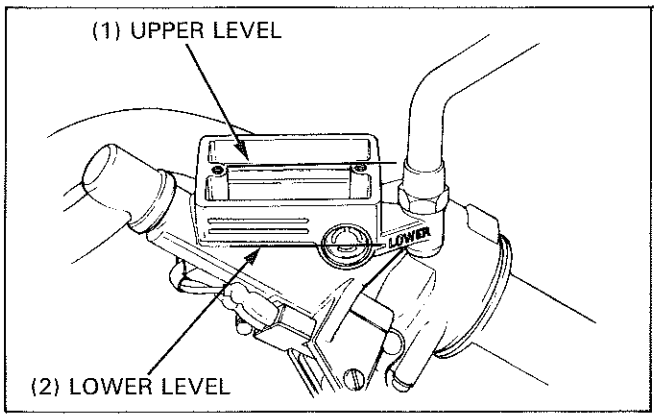
- Adjust the headlight beam as specified by local laws and regulations.

WARNING

- ***An improperly adjusted headlight may blind oncoming drivers, or it may fail to light the road for a safe distance.***



CLUTCH



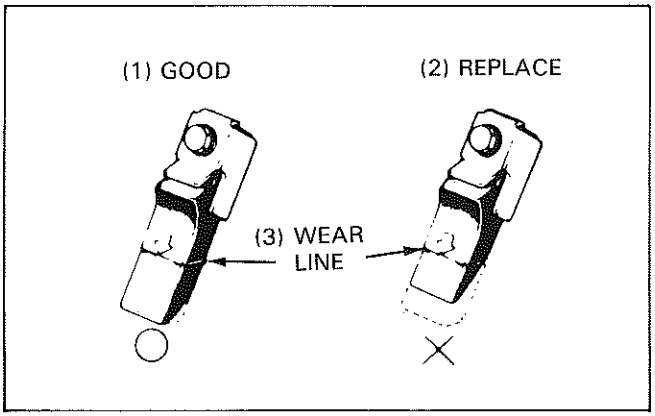
Check the clutch fluid through the sight glass; if the level is visible, remove the cover, set plate and diaphragm. Fill the reservoir to the upper level with DOT 3 or 4 fluid from a sealed container. Check the system for leaks.

NOTE

- Do not allow foreign material to enter the system when filling the reservoir.
- Avoid spilling fluid on painted, plastic or rubber parts.
- Do not remove the reservoir cover until the handlebar has been turned so that the reservoir is level.
- Do not mix different types of fluid, as they are not compatible with each other.

Refer to section 7 for system bleeding procedures.

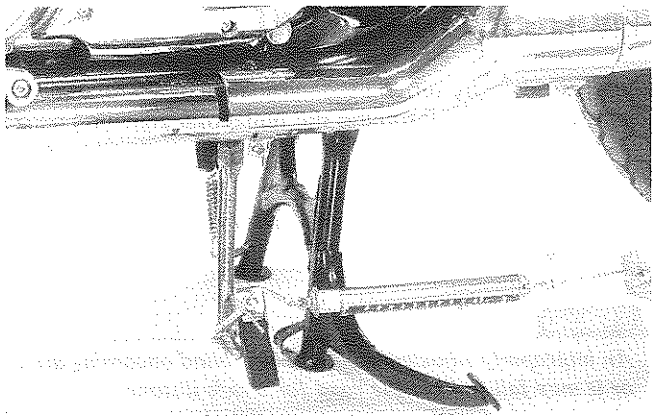
SIDE STAND



Place the motorcycle on its center stand.
Check the rubber pad on the side stand for deterioration and wear.
Replace the rubber pad if wear extends to the wear line.

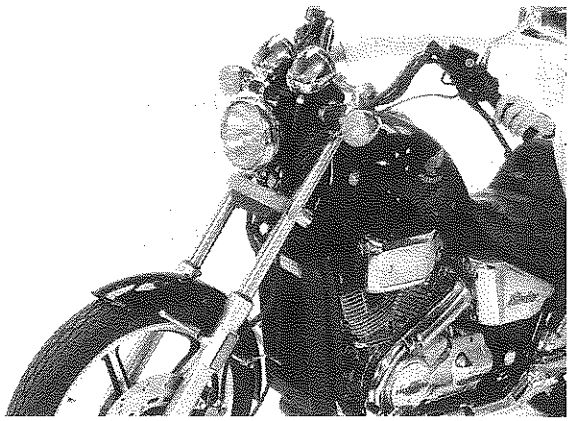
NOTE

- When replacing, use a rubber pad with the mark "Over 260 lbs. ONLY".



Check the side stand spring for damage or loss of tension.
Using a spring scale, measure the force required to retract the side stand. It should be within 2—3 kg (4.4—6.6 lbs), as shown.
Check the side stand assembly for freedom of movement.
Make sure that the side stand is not bent.

SUSPENSION

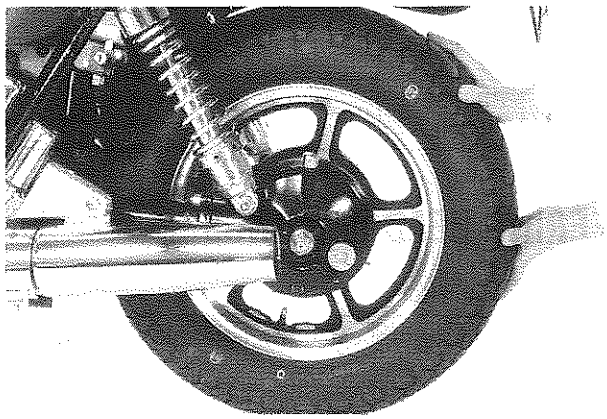


WARNING

- *Do not ride a vehicle with faulty suspension.*
- *Loose, worn or damaged suspension parts impair vehicle stability and control.*

FRONT

Check the action of the front forks by compressing them several times.
Check the entire fork assembly for leaks or damage.
Replace damaged components which cannot be repaired.
Tighten all nuts and bolts.



Check the front fork air pressure when the forks are cold.
Place the vehicle on its center stand.
Remove each air valve cap and measure the air pressure.
AIR PRESSURE:
0—6 psi (0—40 kPa, 0—0.4 kg/cm²)

REAR

Place the motorcycle on its center stand.
Check for worn swingarm bearings by grabbing the rear wheel as shown, and attempting to move the wheel side to side. Replace the bearings if any looseness is noted (page 16-10).
Check the action of the rear shock absorbers by compressing them several times.
Check entire shock absorber assembly for leaks or damage.
Replace any damaged components which cannot be repaired.
Tighten all nuts and bolts.

NUTS, BOLTS, FASTENERS

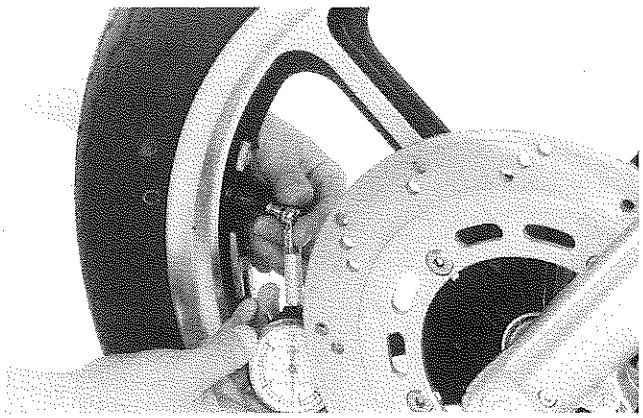
Check that all chassis nuts and bolts are tightened to correct torque values (page 1-5).
Check that all cotter pins, safety clips, hose clamps and cable stays are in place.

WHEELS/TIRES

TIRE PRESSURE

NOTE

- Tire pressure should be checked when tires are COLD.

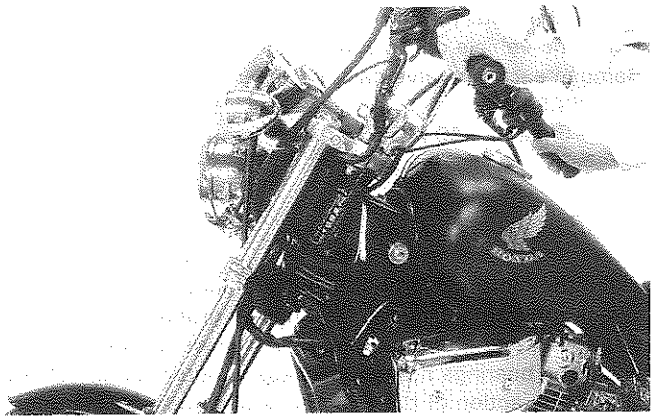


Check the tires for cuts, imbedded nails, or other damage.
Check the front and rear wheels for trueness (Refer to sections 15 and 16).
Measure the tread depth at the center of the tires.
Replace the tires when the tread depth reaches the following limits:

Minimum tread depth:
Front: 1.5 mm (1/16 in)
Rear: 2.0 mm (3/32 in)

Recommended tire pressures and tire sizes:

		Front	Rear
Tire size		100/90—19 57H	140/90—15 70H
Cold tire pressure psi (kg/cm², kPa)	Up to 90 kg (200 lbs) load	32 (2.25, 225)	32 (2.25, 225)
	90 kg (200 lbs) load to vehicle capacity load	32 (2.25, 225)	40 (2.80, 280)
Tire brand	DUNLOP	F11	K627
	BRIDGE-STONE	L303	G508



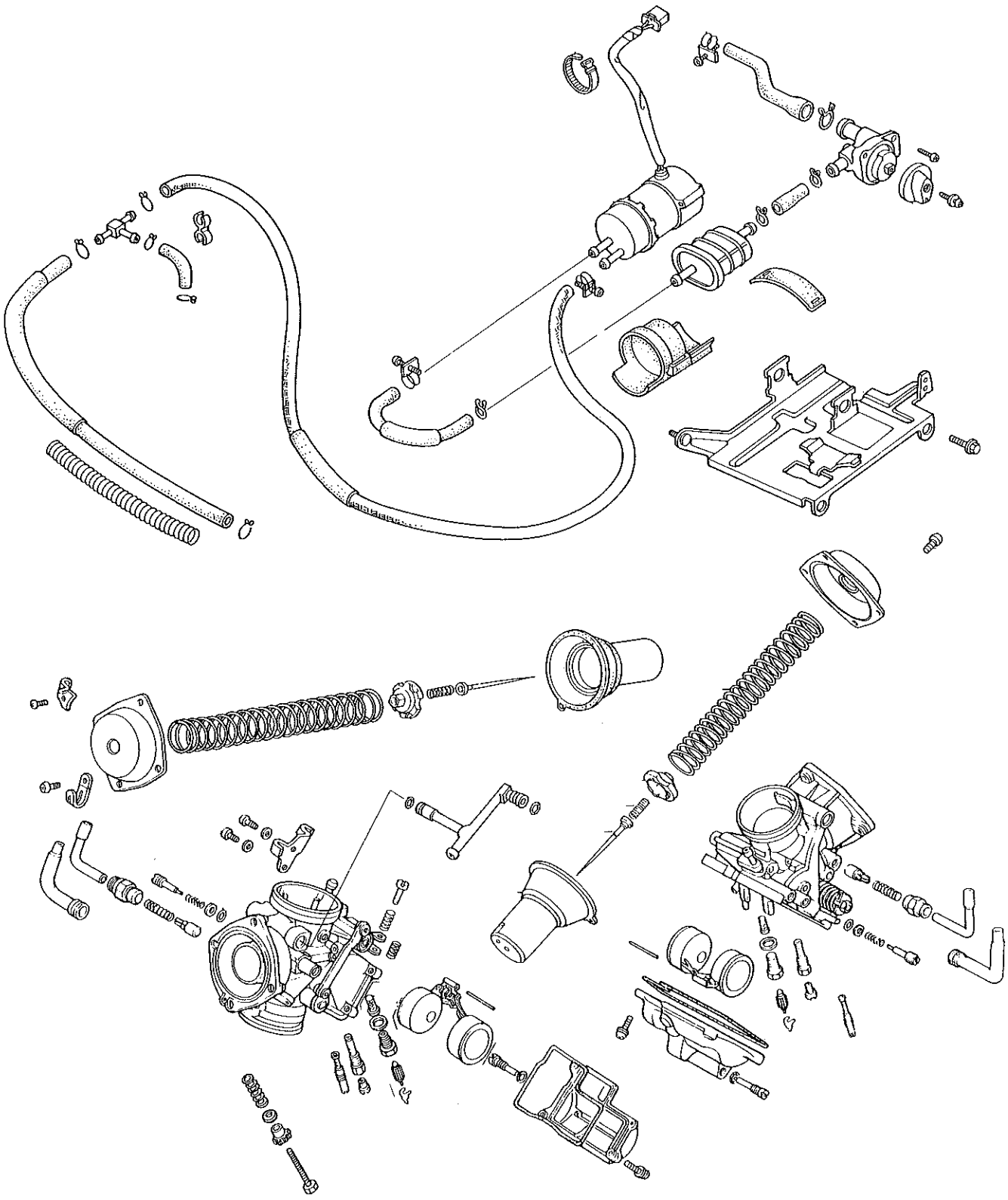
STEERING HEAD BEARINGS

NOTE

- Check that the control cables do not interfere with handlebar rotation.

Raise the front wheel off the ground.
Check that the handlebar moves freely from side to side. If the handlebar moves unevenly, binds, or has vertical movement, inspect the steering head bearings (Section 15).

'86 shown:



SERVICE INFORMATION

GENERAL

WARNING

- *Gasoline is extremely flammable and is explosive under certain conditions. Work in a well ventilated area. Do not smoke or allow flames or sparks in the work area.*

CAUTION

- *Do not bend or twist control cables. Damaged control cables will not operate smoothly and may stick or bind.*

- The engine uses down draft carburetors.
- When disassembling fuel system parts, note the locations of the O-rings. Replace them with new ones on reassembly.
- The float bowls have drain screws that can be loosened to drain residual gasoline.
- The fuel pump inspection and replacement are in section 21.
- Refer to the label on the air cleaner cover for the hose connections of the evaporative emission control system (California model only).
- All hoses used in the evaporative emission control system are numbered for identification. When connecting one of these hoses, compare the hose number with the Vacuum Hose Routing Diagram Label on page 3-10 (California model only), for its routing.

SPECIFICATIONS

Item		49 St. model	California model
Type		Constant Vacuum dual carburetor	
Throttle bore		36.0 mm (1.42 in)	36.0 mm (1.42 in)
Identification No,	'86:	VD7CC	VD7BC
	After '86:	VDGCA	VDGDA
Float level		9.0 mm (0.35 in)	8.0 mm (0.31 in)
Main jet		Front: #112, Rear: #112	Front: #112, Rear: #112
Slow jet	'86:	#40	#40
	After '86:	#38	#38
Idle speed		1,000 ± 100 rpm	1,100 ± 100 rpm
Throttle grip free play		2—6 mm (1/8—1/4 in)	2—6 mm (1/8—1/4 in)
Pilot screw initial opening		See page 4-8	See page 4-8

TORQUE VALUE

Fuel tank mounting bolt	18—25 N·m (1.8—2.5 kg-m, 13—18 ft-lb)

TOOLS

Special

Vacuum/Pressure pump	A937X—041—XXXXX or
Pressure pump	ST—AH—255—MC7 (U.S.A. only)
Vacuum pump	ST—AH—260—MC7 (U.S.A. only)
Valve guide driver, 7 mm	07942—8230000 (U.S.A. only)

Common

Float level gauge	07401—0010000

TROUBLESHOOTING

Engine cranks but won't start
- No fuel in tank
- No fuel to carburetor
- Engine flooded with fuel
- No spark at plug (ignition system faulty)
- Clogged air cleaner
- Intake air leak
- Improper choke operation
- Improper throttle operation

Hard starting or stalling after starting
- Improper choke operation
- Ignition malfunction
- Faulty carburetor
- Fuel contaminated
- Intake air leak
- Incorrect idle speed

Rough idle
- Faulty ignition system
- Incorrect idle speed
- Incorrect carburetor synchronization
- Faulty carburetor
- Fuel contaminated
- Faulty air cut off valve
  (California model only:)
  : Faulty purge control valve
  : Faulty air vent control valve
  : Faulty hoses of the emission control system

After burning during deceleration
- Faulty ignition system
- Faulty air cut off valve
- Lean mixture
  (California model only:)
  : Faulty secondary air supply system
  : Faulty hoses of the emission control system

Misfiring during acceleration
- Faulty ignition system

Backfiring
- Faulty ignition system
- Faulty carburetor

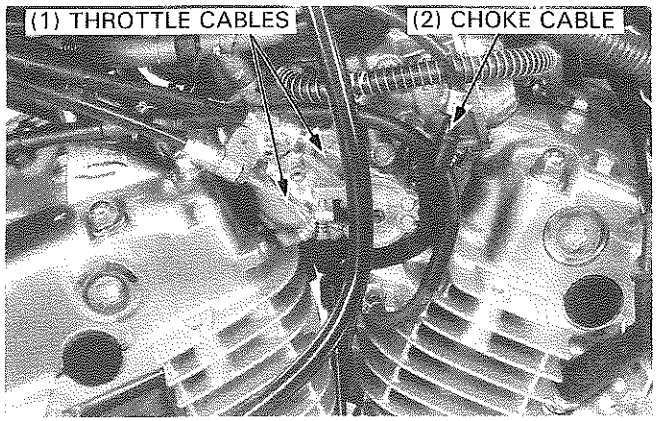
Poor performance (driveability) and poor fuel economy
- Clogged fuel system
- Faulty ignition system
- Dirty air cleaner
  (California model only:)
  : Faulty air vent control valve
  : Faulty hoses of the emission control system

Lean mixture
- Clogged fuel jets
- Stuck vacuum piston
- Faulty float valve
- Low float level
- Clogged fuel tank breather
- Clogged fuel strainer screen
- Restricted fuel line
- Intake air leak
- Restricted or faulty fuel pump

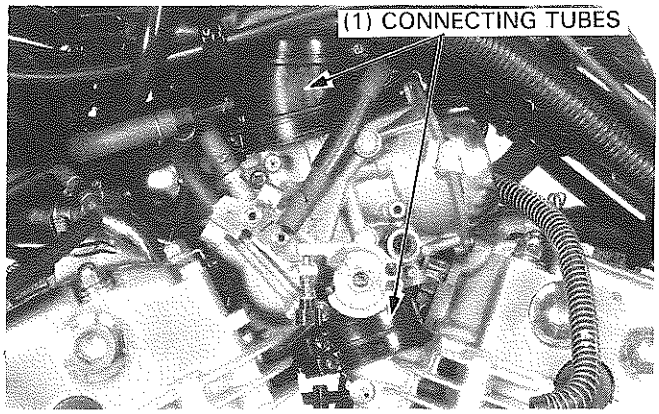
Rich mixture
- Clogged air jets
- Faulty float valve
- Float level too high
- Choke bystarter stuck open
- Dirty air cleaner

CARBURETOR REMOVAL

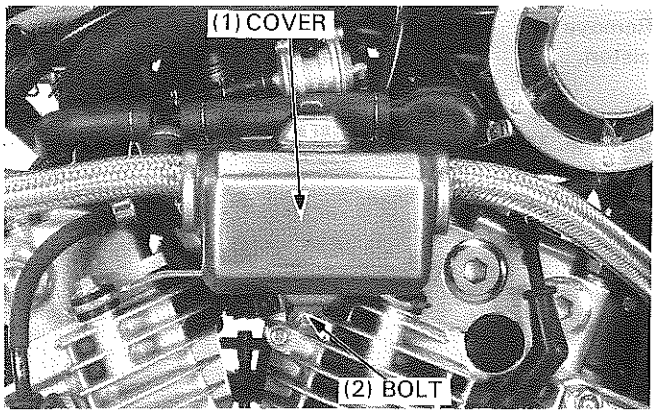
Remove the following:
— main fuel tank (page 4-12).
— air cleaner case (page 4-15).
Disconnect the throttle cables from the throttle drum.
Disconnect the choke cables from the carburetor.
Disconnect the vacuum tubes from the intake pipe and from the T-joint.



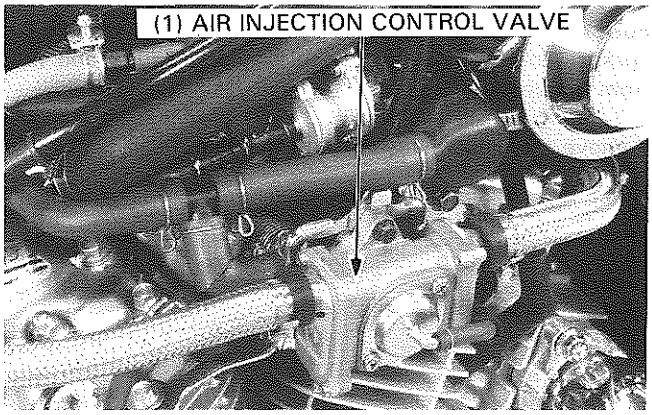
Loosen the carburetor connecting tube bands screws.



● **California model only**
— Remove the air injection control valve cover by removing the one bolt indicated.



— Loosen the tube bands and disconnect the tubes from the air injection control valve.
— Remove the air injection control valve.

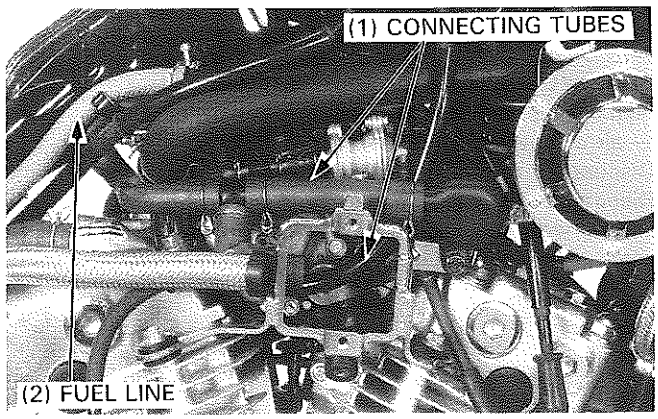


— Remove the air injection control valve stay.

Loosen the front cylinder carburetor connecting tube bands and remove the connecting tube band from the carburetor.

Disconnect the fuel line from the T-fitting.

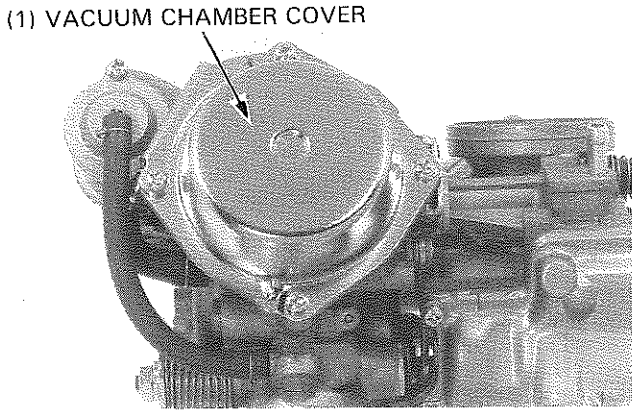
Remove the carburetor as an assembly.



VACUUM CHAMBER

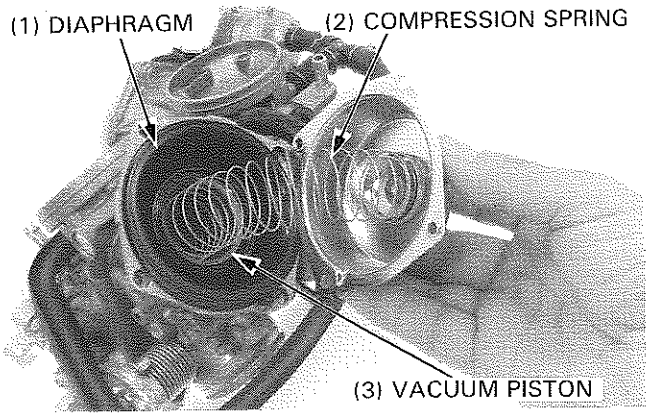
REMOVAL

Remove the four vacuum chamber cover screws and cover.



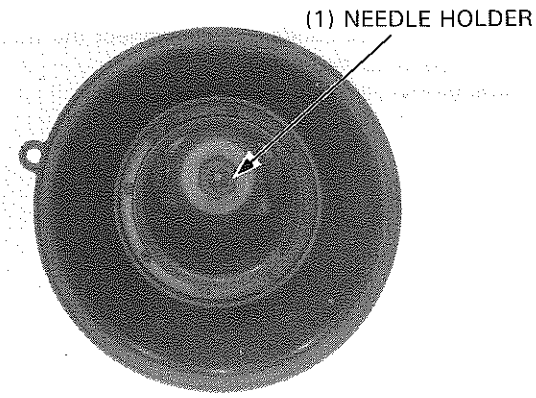
Remove the compression spring, diaphragm and vacuum piston.

Inspect the vacuum piston for wear, scratches or other damage. Make sure the piston moves up and down freely in the chamber.



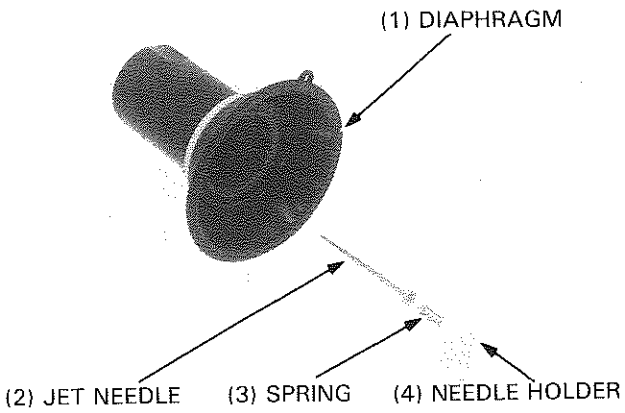
Push the needle holder in and turn it 60 degrees with an 8 mm socket. Then remove the needle holder, spring and needle from the positon.

Remove the plastic washer from the piston.



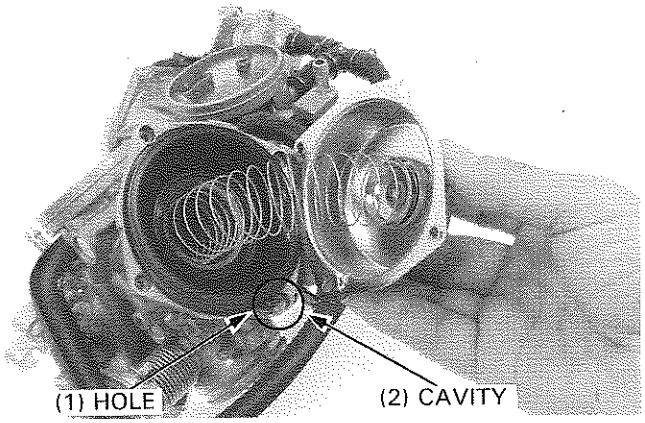
Inspect the needle for excessive wear at the tip or other damage.

Check the diaphragm for deterioration and tears.



INSTALLATION

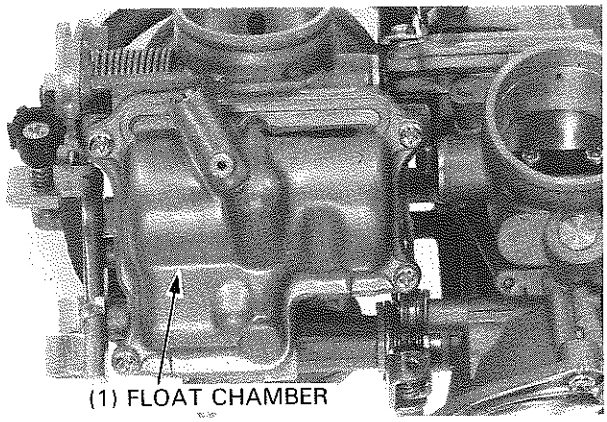
Installation is essentially the reverse of removal.
Install the chamber cover so that its cavity aligns with the hole in the diaphragm.



FLOAT CHAMBER

REMOVAL

Remove the four float chamber screws and the float chamber.



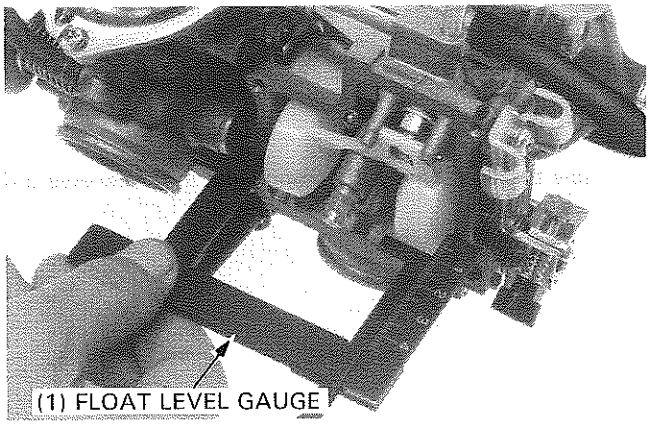
FLOAT LEVEL

Measure the float level with the carburetor inclined 15° – 45° from vertical and the float tang just contacting the float valve.

SPECIFICATIONS: 9.0 mm (0.35 in): 49 st. model
8.0 mm (0.31 in): California model

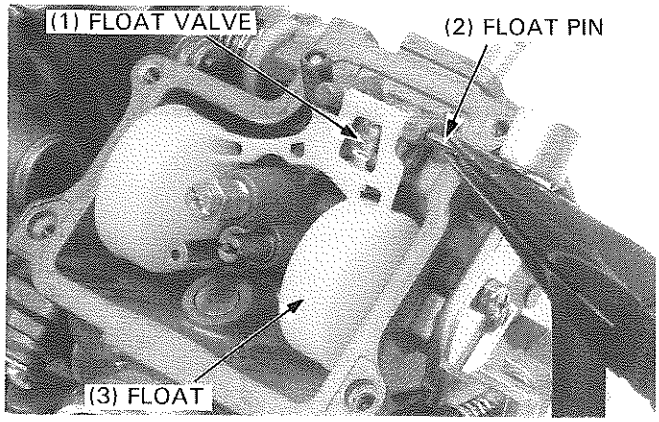
Adjust the float level by carefully bending the float tang.

TOOL:
Float level gauge **07401 – 0010000**



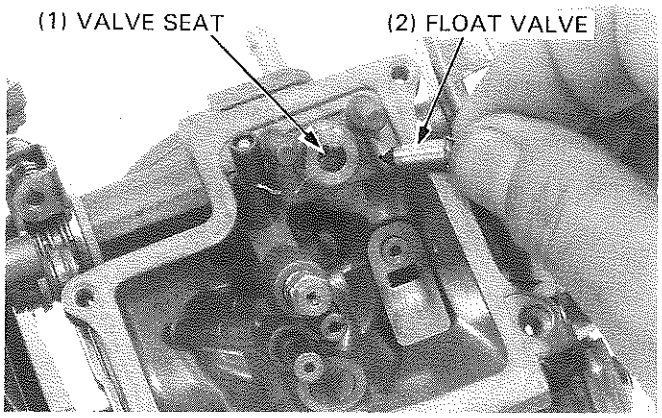
FLOAT AND JETS

Remove the float pin, float and float valve.



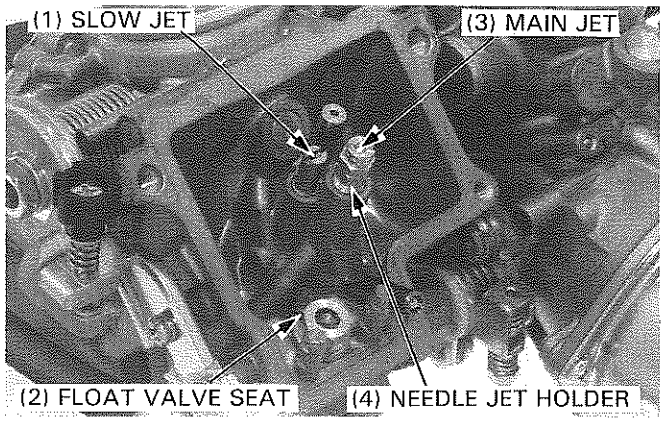
Inspect the float valve for grooves or damage.

Inspect the operation of the float valve.



Remove the main jet, needle jet holder and slow jet.

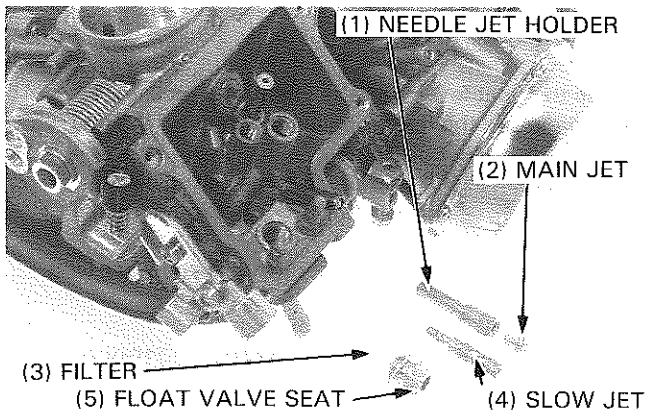
Remove the float valve seat and filter.



Inspect the float valve seat and filter for grooves, damage or deposits.

ASSEMBLY

Assemble the float chamber components in the reverse order of disassembly.



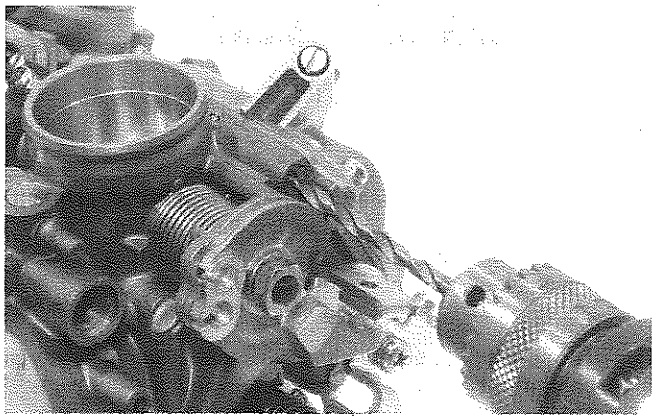
PILOT SCREW

REMOVAL

NOTE

- The pilot screws are factory pre-set and should not be removed unless the carburetors are overhauled.
- The pilot screw plugs are factory installed to prevent pilot screw misadjustment. Do not remove the plugs unless the pilot screws are being removed.
- Cover all openings with tape to keep metal particles out when the plugs are drilled.

Center punch the pilot screw plug to center the drill point. Drill through the plug with a 4 mm (5/32 in) drill bit. Attach a drill stop to the bit 3 mm (1/8 in) from the end to prevent drilling into the pilot screw.

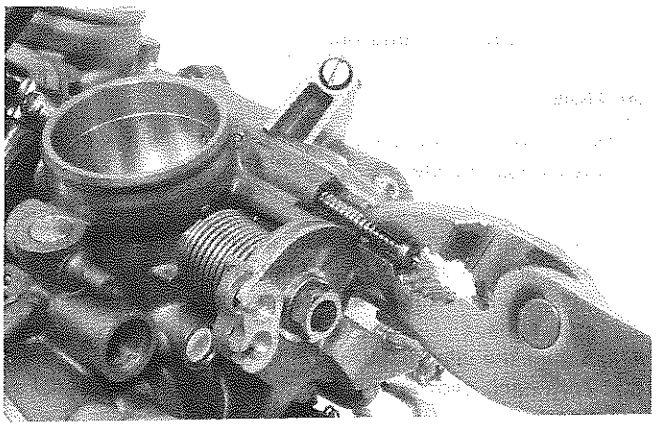


CAUTION

- *Be careful not to drill into the pilot screw.*
- *Both pilot screws must be replaced even if only one requires it, for proper pilot screw adjustment (page 4-8)*

Force a self-tapping 4 mm screw (H/C 069399, P/N 93903—35410) into the drilled plug and continue turning the screwdriver until the plug rotates with the screw.

Pull on the screw head with pliers to remove the plug.



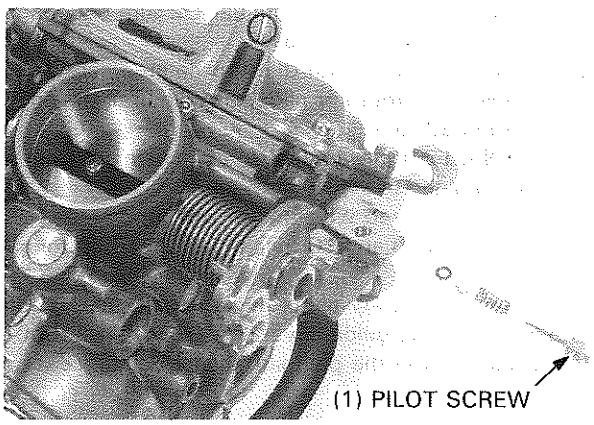
Use compressed air to clean the pilot screw area and remove metal shavings.

Turn each pilot screw in and carefully count the number of turns until it seats lightly. Make a note of this to use as a reference when reinstalling the pilot screws.

CAUTION

- *Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

Remove the pilot screws and inspect them. Replace them if they are worn or damaged.



INSTALLATION

Install the pilot screws and return them to their original position as noted during removal.
Perform pilot screw adjustment if new pilot screws are installed.

NOTE

- Do not install new plugs on new pilot screw holes until after adjustment has been made.
- If you replace the pilot screw in one carburetor, you must replace the pilot screw in the other carburetor for proper pilot screw adjustment.

PILOT SCREW ADJUSTMENT

IDLE DROP PROCEDURE (U.S.A. ONLY)

NOTE

- The pilot screws are factory pre-set and no adjustment is necessary unless the pilot screws are replaced.
- Use a tachometer with graduations of 50 rpm or smaller that will accurately indicate a 50 rpm change.

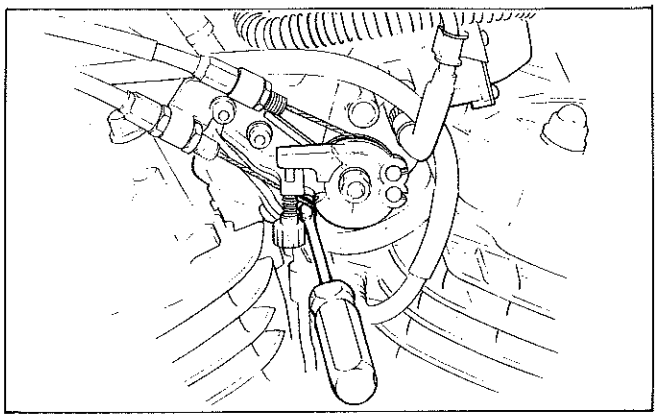
1. Turn each pilot screw clockwise until it seats lightly and back it out to the specification given.
   This is an initial setting prior to the final pilot screw adjustment.

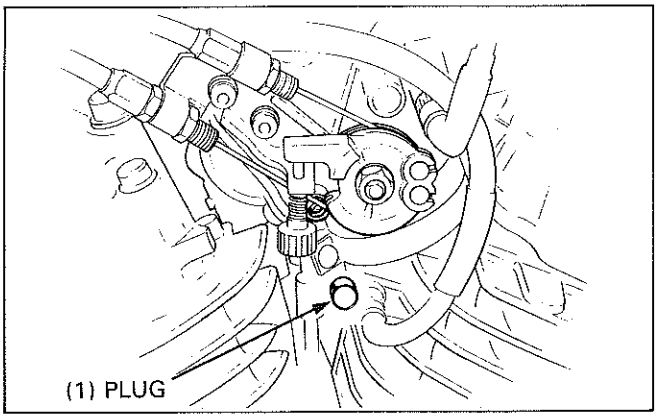
INITIAL OPENING: 2 turns out

CAUTION

- *Damage to the pilot screw seat will occur if the pilot screw is tightened against the seat.*

2. Warm up the engine to operating temperature.
   Stop and go driving for 10 minutes is sufficient.
3. Attach a tachometer according to the manufacturer's instructions.
4. Adjust the idle speed with the throttle stop screw.
5. Turn each pilot screw 1/2 turn out from the initial setting.
6. If the engine speed increases by 50 rpm or more, turn each pilot screw out by a continual 1/2 turn until engine speed drops by 50 rpm or less.
7. Adjust the idle speed with the throttle stop screw.
8. Turn the No. 1 carburetor pilot screw in until the engine speed drops 50 rpm.
9. Turn the No. 1 carburetor pilot screw 1 turn out from the position obtained in step 8.
10. Adjust the idle speed with the throttle stop screw.
11. Perform steps 8, 9 and 10 for the No. 2 carburetor pilot screw.
12. Drive new pilot screw plugs into the pilot screw bores with a 7 mm valve guide driver (P/N 07942—8230000). When fully seated the plug surfaces will be recessed 1 mm.

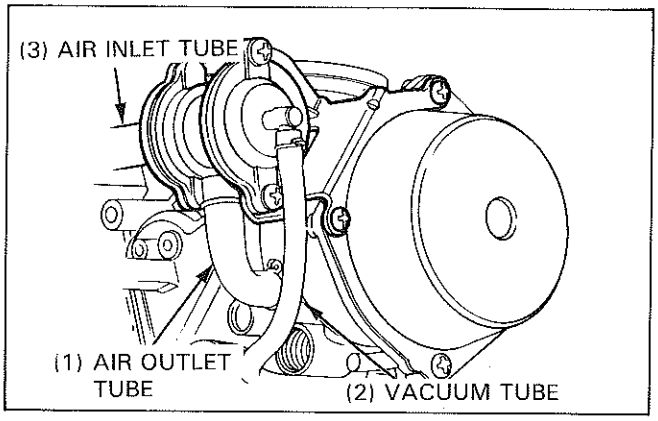




AIR CUT OFF VALVE

REMOVAL ('86 only:)

Remove the fuel tank mount bolts (page 4-12) and raise the fuel tank.
Disconnect the vacuum, air inlet and outlet tubes from the air cut off valve.
Remove the two air cut off valve mount screws and the air cut off valve.



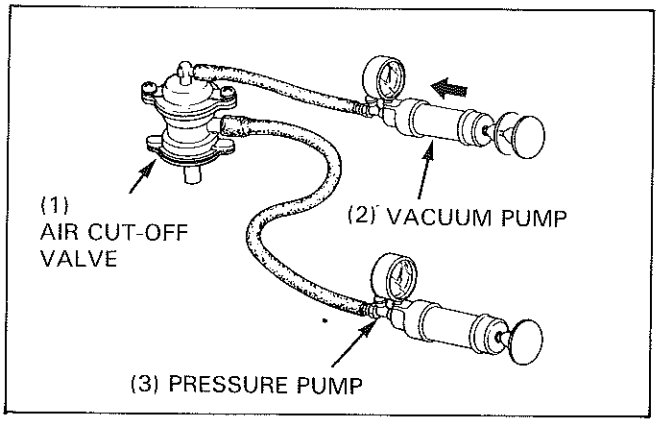
INSPECTION

'86 only:
Connect a vacuum pump to the vacuum tube, and a pressure pump to the air intake tube.
Apply specified vacuum to the vacuum tube and apply air to the air intake tube.

SPECIFIED VACUUM: Above 490 mm (19.3 in) Hg
SPECIFIED AIR: Below 10 psi (0.7 kg/cm, 69 kPa)

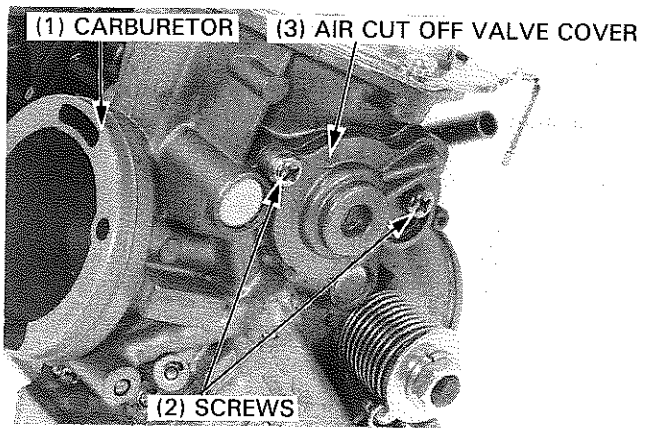
TOOLS:

Vacuum/Pressure pump	**A937X—041—XXXXX (U.S.A. only) or**
Vacuum pump	**ST—AH—255—MC7 and**
Pressure pump	**ST—AH—260—MC7**



Air should not flow out.
Release vacuum and apply air.
Air should flow out
If you fails either check, replace the air cut off valve as an assembly.

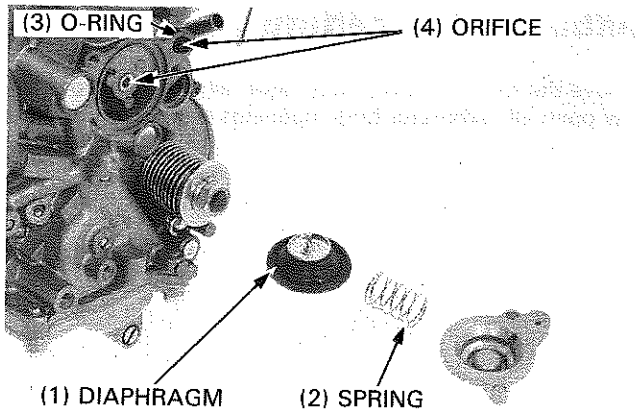
After '86:
Remove the carburetor (page 4-3).
Remove the two screws and air cut off valve cover.



NOTE

- '86: The air cut off valve is separated type.
  After '86: The valve is built-in type.
- The air cut off valve cover is under spring pressure. Do not loose a spring and screws.

Visually check the following, and replace the new one if desired.
— diaphragm for deterioration, pin hole or other damage.
— spring for deterioration or other damage.
— needle of the diaphragm for excessive wear at the tip or other damage.
— orifice of air vent for clogged or restricted.
— O-ring for damaged.



INSTALLATION

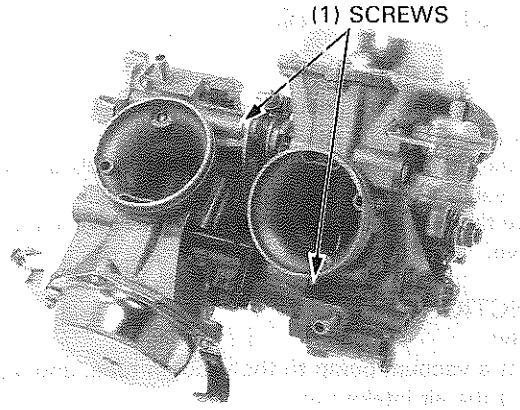
'86 only:
Install the air cut off valve with the two screws.
Connect the vacuum, air inlet and out let tubes.
Lower and install the fuel tank (page 4-12).

After '86:
Install the air cut off valve cover by attaching screws and tighten the screws securely.
Install the carburetor (page 4-12).

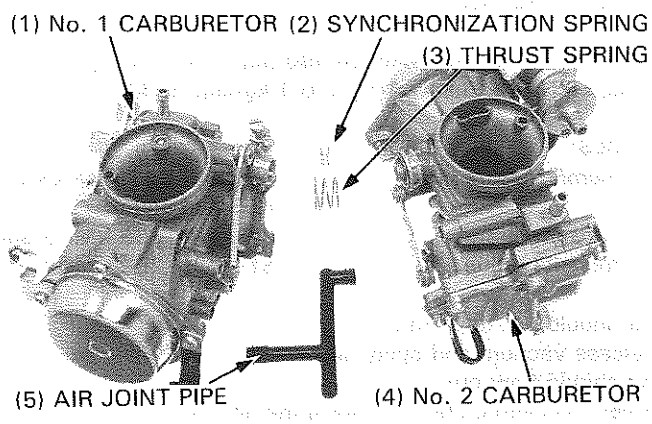
CARBURETOR SEPARATION

Remove the air tubes, fuel tubes and air cut off valve from the carburetors.

Remove the two screws connecting the carburetors.

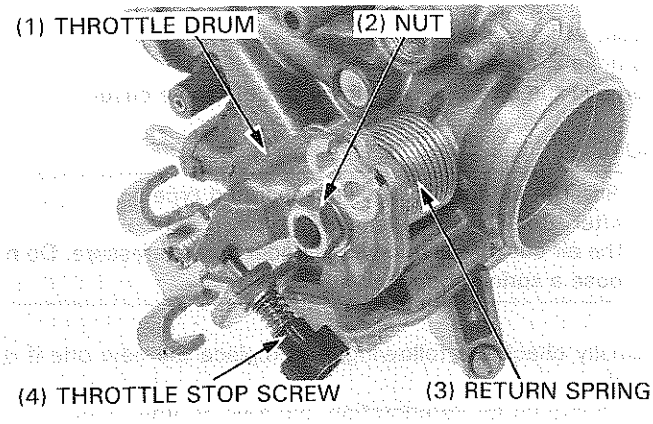


Carefully separate the No. 1 and No. 2 carburetors.



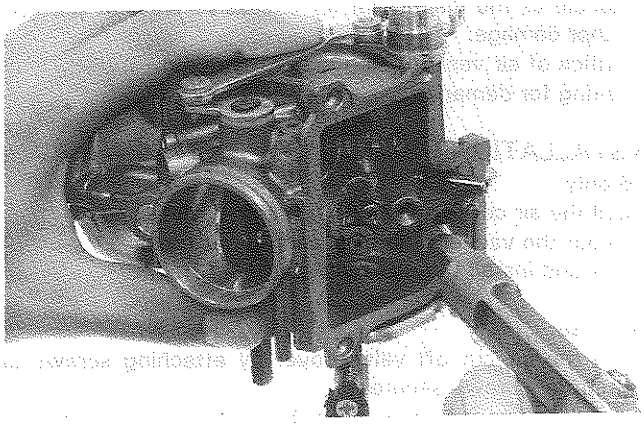
Loosen the throttle stop screw.

Remove the nut attaching the throttle drum and remove the throttle drum and return spring.



CARBURETOR CLEANING

Remove the throttle valve, float valve, all jets and pilot screw. Blow open all carburetor body openings with compressed air.



CARBURETOR ASSEMBLY

Install the throttle return spring, throttle drum and nut.

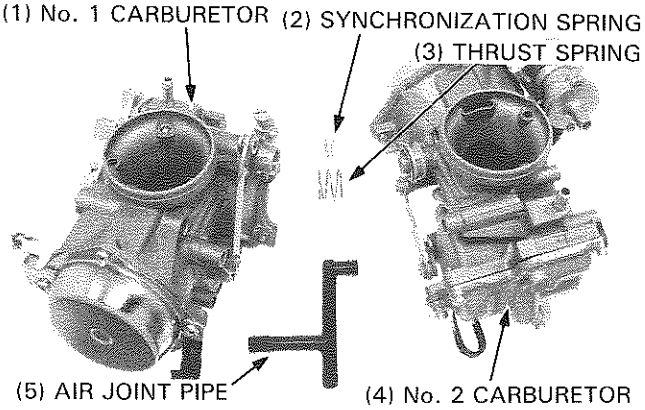
Tighten the nut securely.

Coat new O-rings with oil and install them on the air joint pipe.

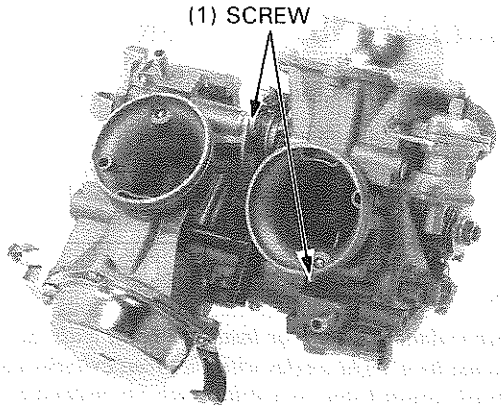
Put the No. 1 and No. 2 carburetors together with the air joint pipe, thrust collar and spring.

Loosen the synchronization adjusting screw until there is no tension.

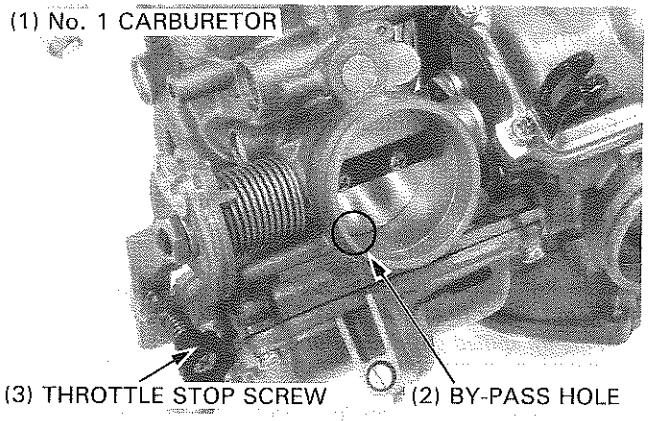
Install the synchronization spring.



Secure the carburetors together with the two attaching screws.



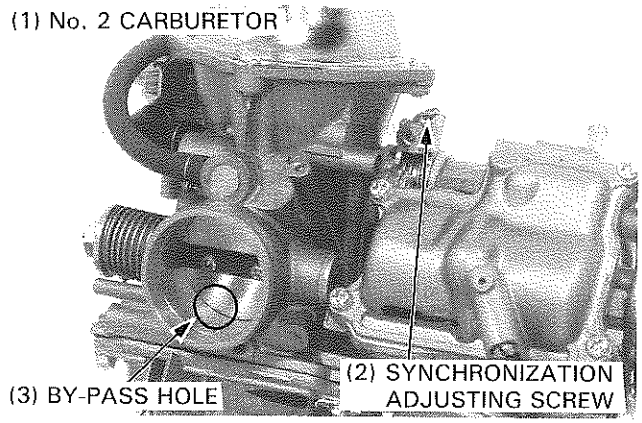
Turn the throttle stop screw to align the No. 1 throttle valve with the edge of the by-pass hole.



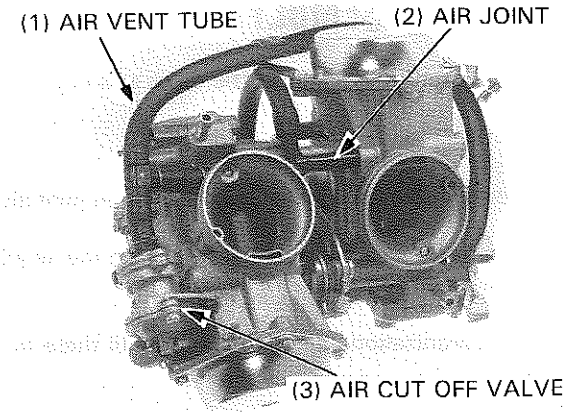
Align the No. 2 throttle valve with the by-pass hole edge by turning the synchronization adjusting screw.

Inspect throttle operation as described below:

- Open the throttle slightly by pressing on the throttle linkage. Then release the throttle.
- Make sure that it returns smoothly.
- Make sure that there is no drag when opening and closing the throttle.



Install the air cut off valve, air tubes and fuel tubes as shown.



CARBURETOR INSTALLATION

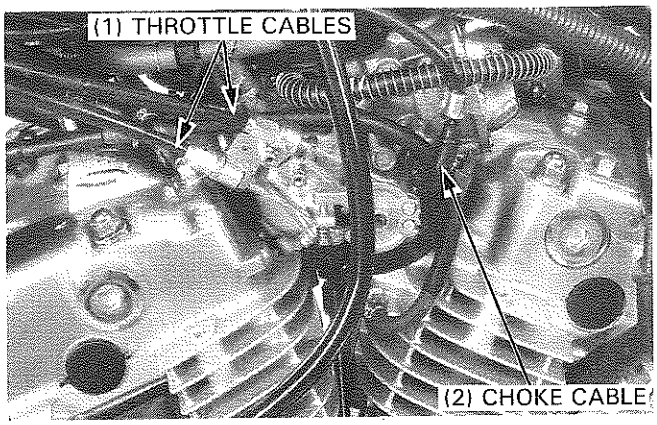
Installation is essentially the reverse of removal.

NOTE

- Route the throttle and choke cables properly (pages 1-9 thru 1-13).

CAUTION

- *The rear cylinder carburetor insulator band ends (screw positions) must be at right angles with the front cylinder to prevent the throttle drum from interfering with the insulator bands.*

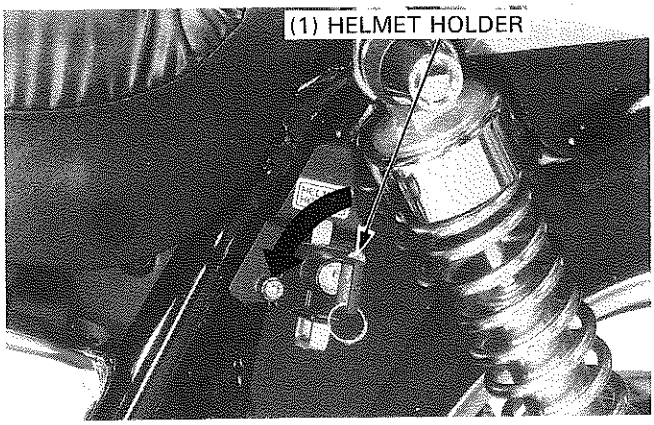


Perform the following inspections and adjustments.
- Throttle operation (page 3-5).
- Carburetor choke (page 3-6).
- Carburetor idle speed (page 3-8).
- Carburetor synchronization (page 3-8).

FUEL TANK

WARNING

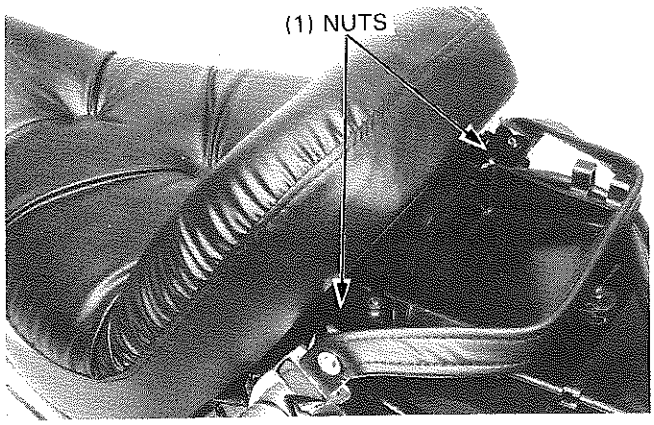
- ***Do not allow flames or sparks near gasoline.***
- ***Wipe up spilled gasoline at once.***



Remove the rear seat by inserting the ignition key into the helmet holder and turning it counterclockwise.

Drain the gasoline.

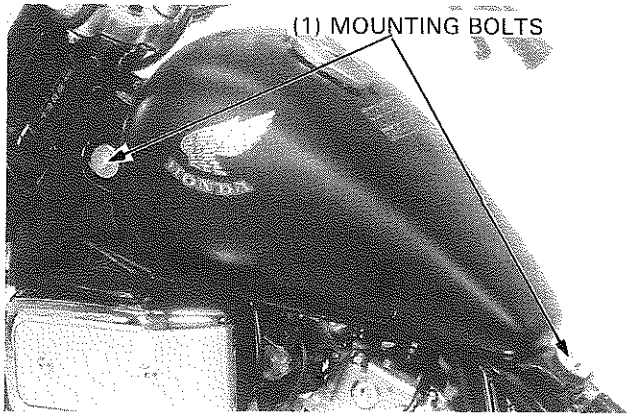
Remove the front seat by removing the two nuts and washers.



Remove the fuel tank mounting bolts and disconnect the fuel tubes.
Remove the fuel tank.

Install the fuel tank in the reverse order of removal.

TORQUE:
Fuel tank mounting bolt: 18–25 N·m
(1.8–2.5 kg-m, 13–18 ft-lb)



AIR CLEANER CASE

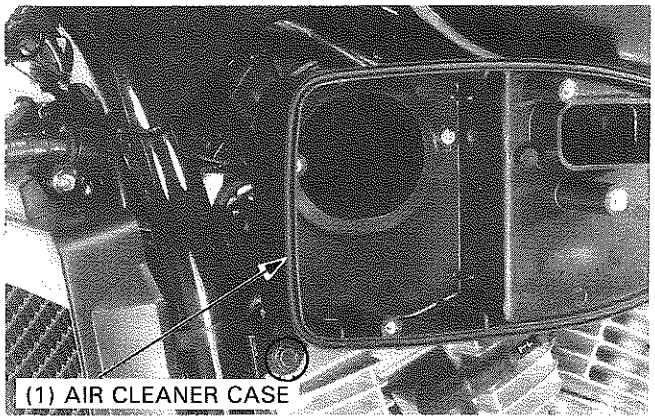
REMOVAL

Remove the two air cleaner mounting bolts.

Loosen the air cleaner connecting tube band screw and remove the air cleaner case.

INSTALLATION

Install the air cleaner case in the reverse order of removal.



HIGH ALTITUDE ADJUSTMENT (U.S.A. only)

When the vehicle is to be operated continuously above 2,000 m (6,500 feet) the carburetor must be readjusted as follows to improve driveability and decrease exhaust emissions.

Remove each pilot screw plug (page 4-7).

Warm up the engine to operating temperature. Stop and go driving for 10 minutes is sufficient.

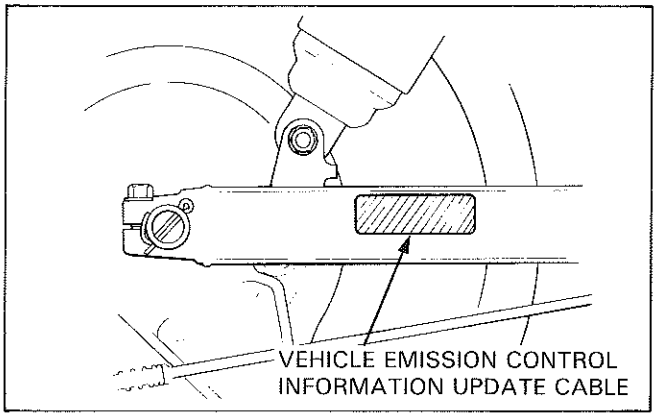
Turn each pilot screw clockwise 1/2 turn.

Adjust the idle speed to specification (page 4-1), with the throttle stop screw.

Drive new pilot screw plugs into the pilot screw bores (page 4-8).

NOTE

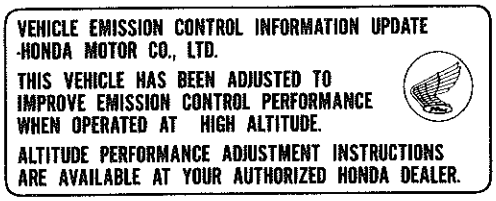
- This adjustment must be made at high altitude to ensure proper high altitude operation



Attach a Vehicle Emission Control Information Update label on the right side of swingarm as shown. See SL#132 for information on obtaining the label.

NOTE

- Do not attach the label to any part that can be easily removed from the vehicle.



WARNING

- ***Operation at an altitude lower than 1,500 m (5,000 feet) with the carburetors adjusted for high altitudes may cause the engine to idle roughly and stall.***
- ***When the vehicle is to be operated continuously below 1,500 m (5,000 feet), turn each pilot screw counterclockwise 1/2 turn to its original position after removing each pilot screw plug and adjust the idle speed to specification (page 4-1). Drive new pilot screw plugs into the pilot screw bores (page 4-8). Be sure to do these adjustments at low altitude.***

[ ] : California model

	STANDARD (BELOW 1,500 m, 5,000 ft)	HIGH ALTITUDE (ABOVE 2,000 m, 6,500 ft)
PILOT SCREW INITIAL OPENING	2 turns out	1-1/2 turns out
IDLE SPEED	1,000 ± 100 rpm [1,100 ± 100 rpm]	1,000 ± 100 rpm [1,100 ± 100 rpm]

PURGE CONTROL VALVE INSPECTION (California model)

NOTE

- The purge control valve should be inspected if hot restart is difficult.

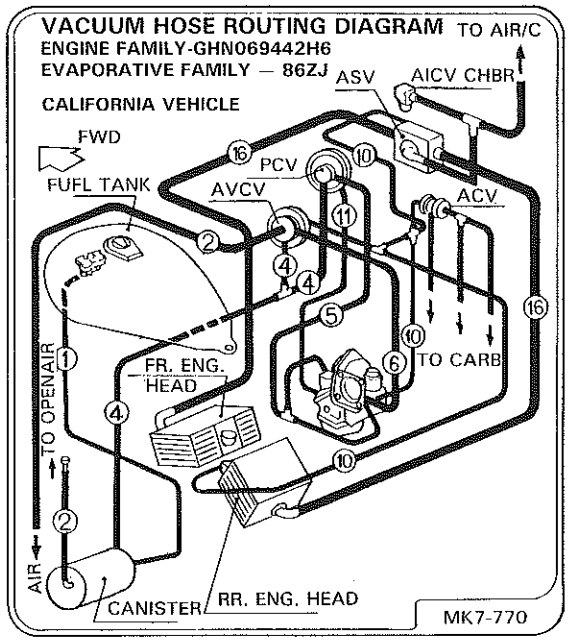
Check all fuel tank, Purge Control Valve (PCV), and charcoal canister hoses to be sure they are not kinked and are securely connected. Replace any hose that shows signs of damage or deterioration.

NOTE

- The PCV is located behind the horn.

Disconnect the PCV hoses from their connections and remove the PCV from its mount. Refer to the routing label on the inside of the right side cover for hose connections.

'86 shown, subsequent years similar.



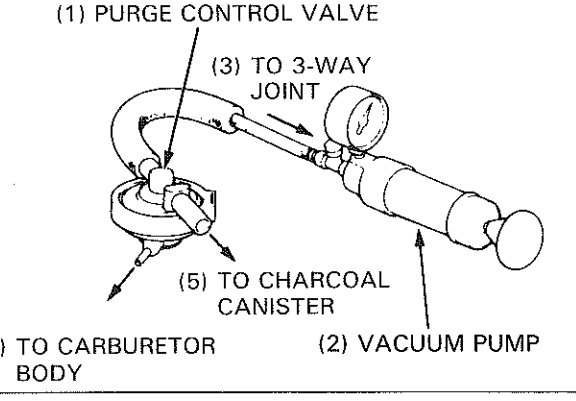
Connect a vacuum pump to the 8 mm (0.31 in.) I.D. hose that goes to the 3-way joint. Apply the specified vacuum to the PCV.

SPECIFIED VACUUM: 250 mm (9.8 in) Hg

The specified vacuum should be maintained.
Replace the PCV if vacuum is not maintained.

TOOL:

Vacuum/Pressure pump	**A937X–041–XXXXX or**
Vacuum pump	**ST–AH–260–MC7 (U.S.A. only)**



Remove the vacuum pump and connect it to the vacuum hose that goes to the left carburetor body.
Apply the specified vacuum to the PCV.
SPECIFIED VACUUM: 250 mm (9.8 in) Hg

The specified vacuum should be maintained.
Replace the PCV if vacuum is not maintained.
TOOL:

Vacuum/Pressure pump	**A937X—041—XXXXX or**
Vacuum pump	**ST—AH—260—MC7**
	(U.S.A. only)

Connect a pressure pump to the 8 mm (0.31 in.) I.D. hose that goes to the charcoal canister. While applying the specified vacuum to the PCV hose that goes to the 3-way joint pump air through the canister hose. Air should flow through the PCV and out the hose that goes to the 3-way joint.
Replace the PCV if air does not flow out.

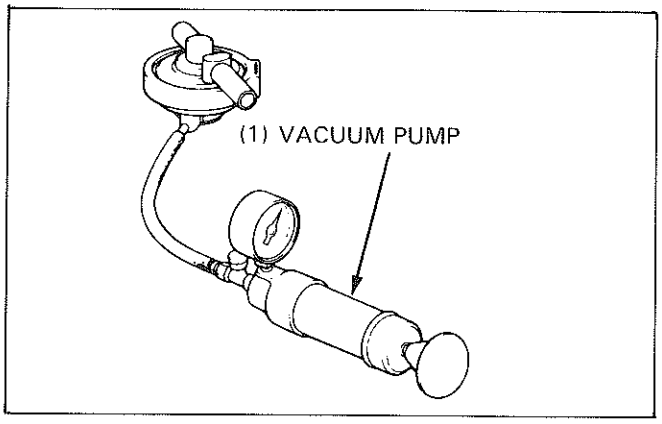
CAUTION

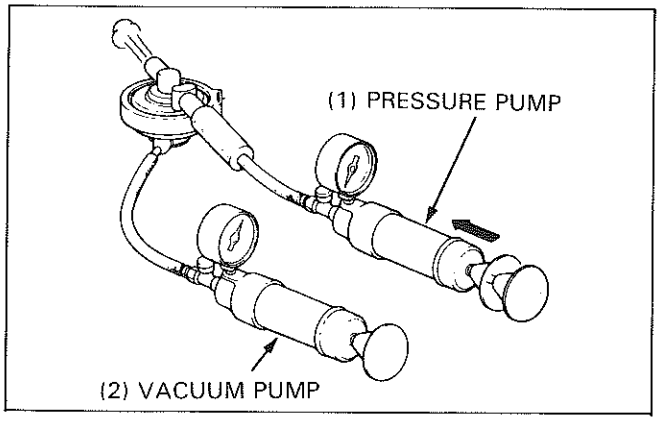
- *To prevent damage to the purge control valve, do not use high air pressure sources. Use a hand operated air pump only.*

TOOL:

Vacuum/Pressure pump	**A937X—041—XXXXX or**
Vacuum pump	**ST—AH—260—MC7**
Pressure pump	**ST—AH—255—MC7**
	(U.S.A. only)

Remove the pumps, install the PCV on its mount, route and reconnect the hoses according to the routing label.





AIR VENT CONTROL VALVE INSPECTION (California model)

Disconnect the Air Vent Control Valve (AVCV) hoses from their connections and remove the AVCV from its mount. Refer to the routing label on right side cover for hose connections.
Connect a vacuum pump to the No. 10 hose that goes to the 3-way joint.
Apply the specified vacuum to the AVCV.
SPECIFIED VACUUM: 250 mm (9.8 in) Hg

TOOL:

Vacuum/Pressure pump	**A937X—041—XXXXX or**
Vacuum pump	**ST—AH—260—MC7**
	(U.S.A. only)

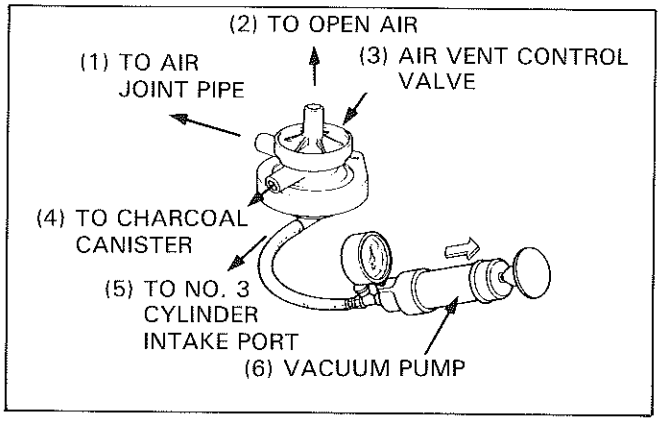
The specified vacuum should be maintained.
Replace the AVCV if vacuum is not maintained.

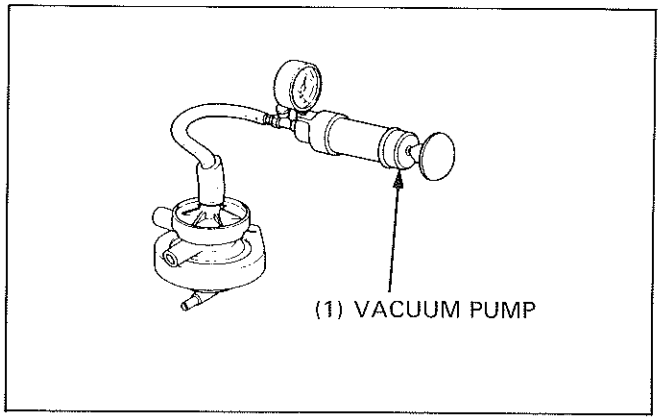
CAUTION

- *To prevent damage to the air vent control valve, do not use high air pressure sources. Use a hand operated air pump only.*

Connect the vacuum pump to the air vent port of the AVCV. Apply vacuum to the AVCV. The vacuum should hold steady.
Replace the AVCV if vacuum leaks.
TOOL:

Vacuum/Pressure pump	**A937X—041—XXXXX or**
Vacuum pump	**ST—AH—260—MC7**
	(U.S.A. only)

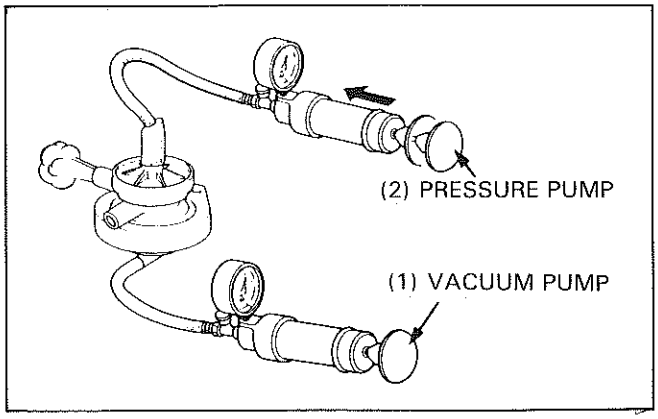




Connect the vacuum pump to the No. 10 hose that goes to the 3-way joint.
Connect the pressure pump to the air vent port of the AVCV.
While applying the vacuum to the AVCV No. 10 hose that goes to the 3-way joint, pump air through the air vent port.
Air should flow through the AVCV and out the hose that goes to the carburetor air joint pipe.

TOOL:

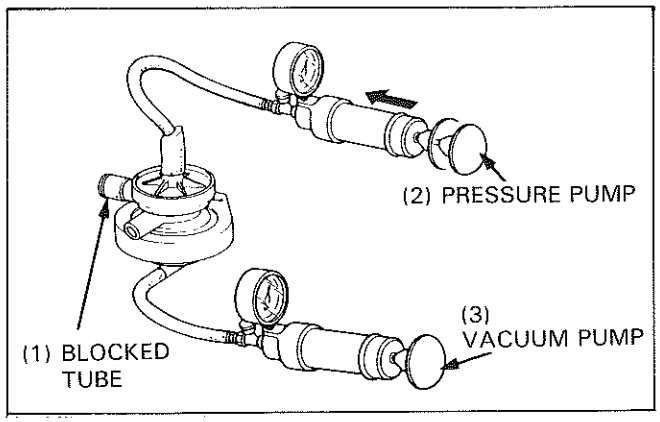
Vacuum/Pressure pump	**A937X—041—XXXXX or**
Vacuum pump	**ST—AH—260—MC7**
Pressure pump	**ST—AH—255—MC7**
	(U.S.A. only)



Plug the hose that goes to the carburetor air joint pipe.
While applying vacuum to the AVCV No. 10 hose that goes to the 3-way joint, apply air pressure.
It should hold steady.
Replace the AVCV if pressure is not retained.
Remove the pumps, install the AVCV on its mount, route and reconnect the hoses according to the routing label.

TOOL:

Vacuum/Pressure pump	**A937X—041—XXXXX or**
Vacuum pump	**ST—AH—260—MC7**
Pressure pump	**ST—AH—255—MC7**
	(U.S.A. only)



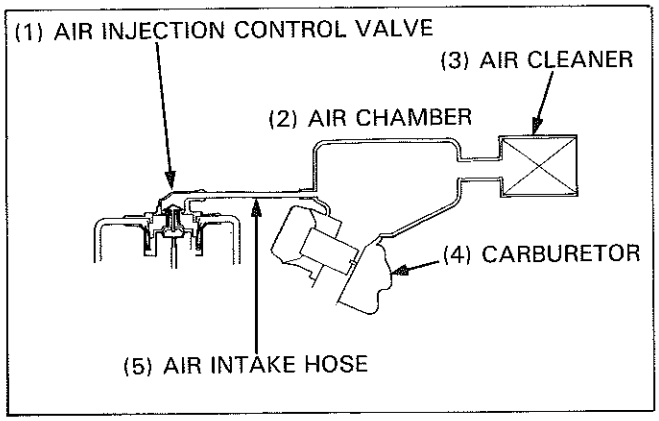
SECONDARY AIR SUPPLY SYSTEM (California model)

SYSTEM INSPECTION

Start the engine and warm it up to normal operating temperature.
Raise the fuel tank and disconnect the secondary air intake hose from the air chamber.

NOTE

- Do not disconnect the fuel tubes from the tank.

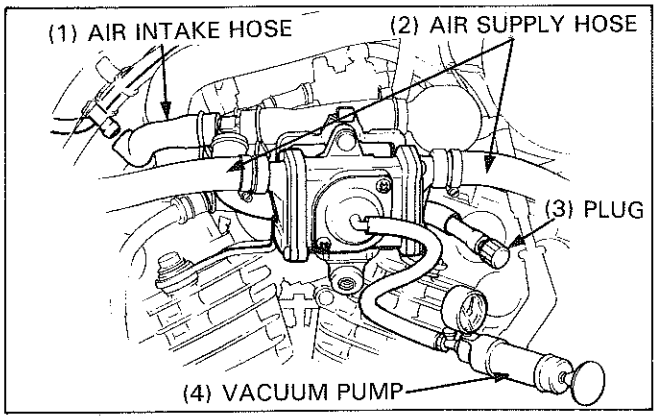


Check that the secondary air intake ports are clean and free of carbon deposits.

Check the secondary air intake hose for clogging deterioration or damage and replace if necessary.
Check the reed valves in the air injection control valve (AICV) if the intake hose or supply hose is damaged by exhaust gas.
Disconnect the vacuum tube (No. 10) from the AICV and install a plug to the vacuum tube to keep air from entering.
Connect the vacuum pump to the AICV.

TOOL:

Vacuum/Pressure pump	**A937X—041—XXXXX or**
Vacuum pump	**ST—AH—260—MC7**
	(U.S.A. only)

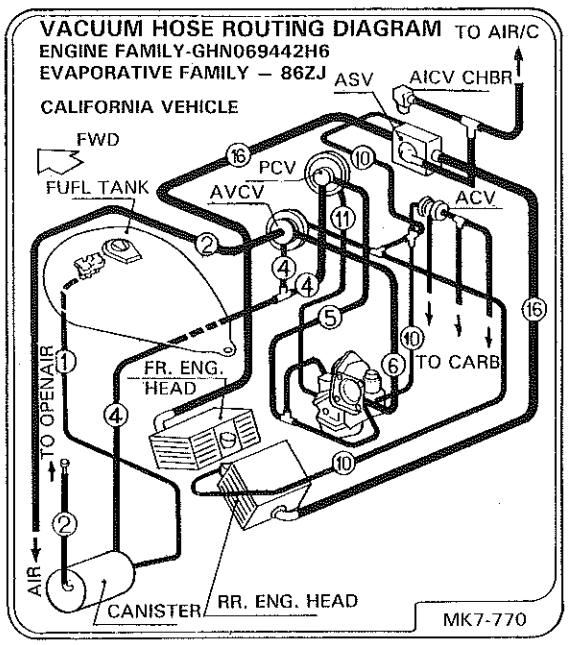


Start the engine and open the throttle slightly to be certain that air is sucked in through the intake hose.
If air is not drawn in, check the air supply hoses and vacuum tube for clogging.
With the engine running, gradually apply vacuum to the AICV. Check that the air intake hose stops drawing air, and that the vacuum does not bleed.

SPECIFIED VACUUM:
300–370 mm (11.8–14.6 in) Hg

If air still drawn in, or if the specified vacuum is not maintenaned, install a new AICV.
If afterburn occurs on deceleration, even when the secondary air supply system is normal, check the air cut-off valve for correct vacuum operation.

'86 shown, subsequent years similar.



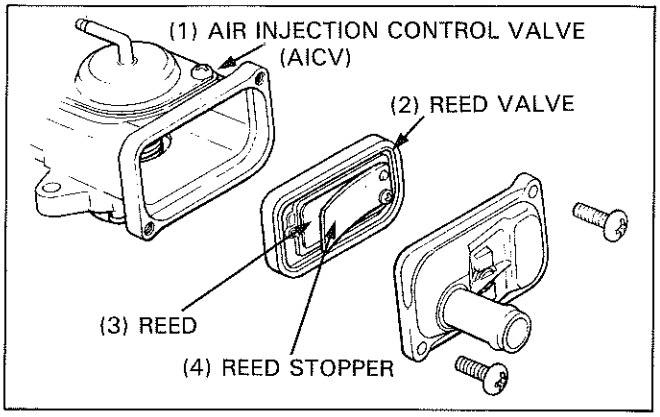
REED VALVE INSPECTION

Disconnect the air supply hoses from the reed valve covers of the AICV.
Disconnect the vacuum tube and air intake hose from the AICV.
Remove the AICV mounting bolts and AICV.

Remove the four screws and reed valve covers and reed valves from the AICV.

Check the reed valves for damage or fatigue, and replace if necessary.

Install a new reed valve if the seat rubber is cracked or damaged, or if there is clearance between the reed valve and seat.



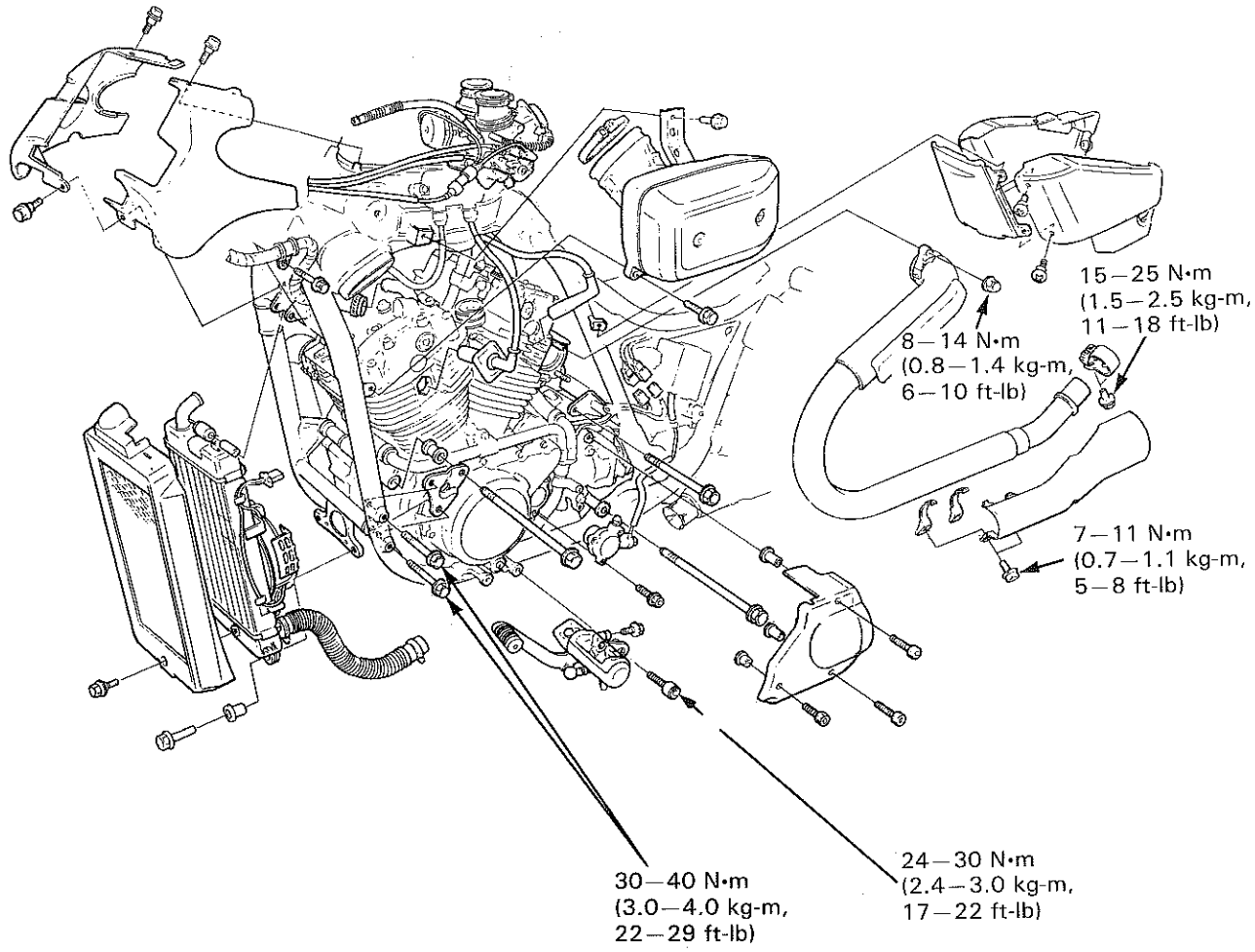
CAUTION

- *Do not disassemble or bend the reed stopper.*
- *The reed valve must not be replaced.*
- *If the stopper, reed or seat is faulty, replace it as an assembly.*

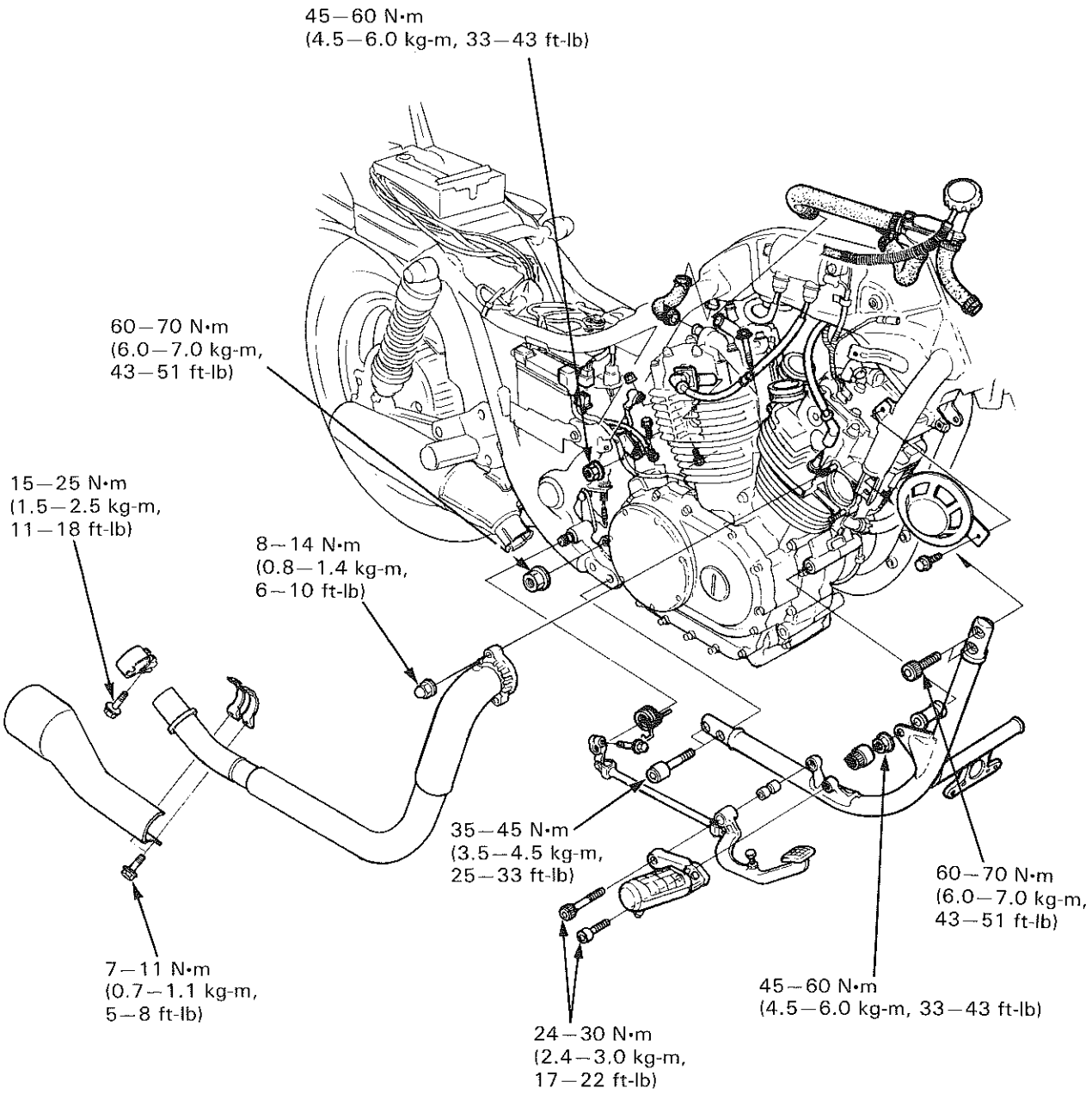
Assemble and install the AICV in the reverse order of disassembly/removal.

NOTE

- After installing, make sure the air and vacuum tubes are correctly connected (page 1-10 to 14.).


15—25 N·m
(1.5—2.5 kg-m,
11—18 ft-lb)
8—14 N·m
(0.8—1.4 kg-m,
6—10 ft-lb)
7—11 N·m
(0.7—1.1 kg-m,
5—8 ft-lb)
30—40 N·m
(3.0—4.0 kg-m,
22—29 ft-lb)
24—30 N·m
(2.4—3.0 kg-m,
17—22 ft-lb)

5. ENGINE REMOVAL/INSTALLATION



SERVICE INFORMATION

GENERAL

- A floor jack or other adjustable support is required to support and maneuver the engine.
- The following parts or components can be serviced with the engine installed in the frame:
  - Clutch
  - Gearshift linkage
  - Oil pump and oil filter
  - Alternator
  - Starter motor
  - Carburetors

SPECIFICATIONS

Engine dry weight	80 kg (176 lb)
Oil capacity	3.5 lit (3.7 US qt, 3.1 Imp qt) at disassembly
Coolant capacity	1.83 lit (1.92 US qt, 1.61 Imp qt) total

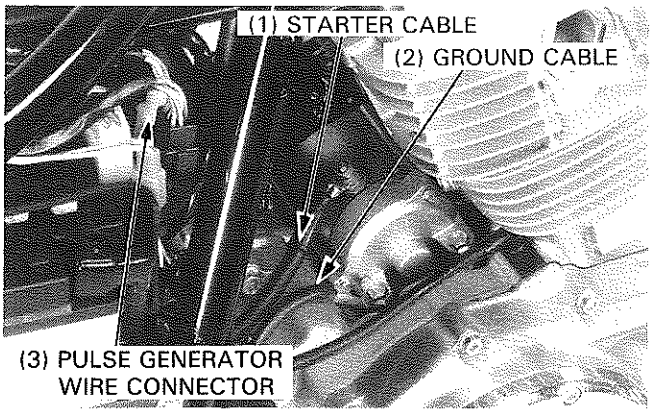
TORQUE VALUES

Muffler stay	18—25 N•m (1.8—2.5 kg-m, 13—18 ft-lb)
Exhaust pipe protector band	7—11 N•m (0.7—1.1 kg-m, 5—8 ft-lb)
Exhaust pipe joint nut	8—14 N•m (0.8—1.4 kg-m, 6—10 ft-lb)
Muffler band	15—25 N•m (1.5—2.5 kg-m, 11—18 ft-lb)
Brake pedal	24—30 N•m (2.4—3.0 kg-m, 17—22 ft-lb)
Foot peg	24—30 N•m (2.4—3.0 kg-m, 17—22 ft-lb)
Front engine mounting bolt	45—60 N•m (4.5—6.0 kg-m, 33—43 ft-lb)
Rear lower engine mounting bolt	60—70 N•m (6.0—7.0 kg-m, 43—51 ft-lb) Apply oil to the threads
Rear upper engine mounting bolt	45—60 N•m (4.5—6.0 kg-m, 33—43 ft-lb)
Front engine mounting bracket	30—40 N•m (3.0—4.0 kg-m, 22—29 ft-lb)
Front sub-frame bolt	60—70 N•m (6.0—7.0 kg-m, 43—51 ft-lb) Apply oil to the threads
Rear sub-frame bolt	35—45 N•m (3.5—4.5 kg-m, 25—33 ft-lb)

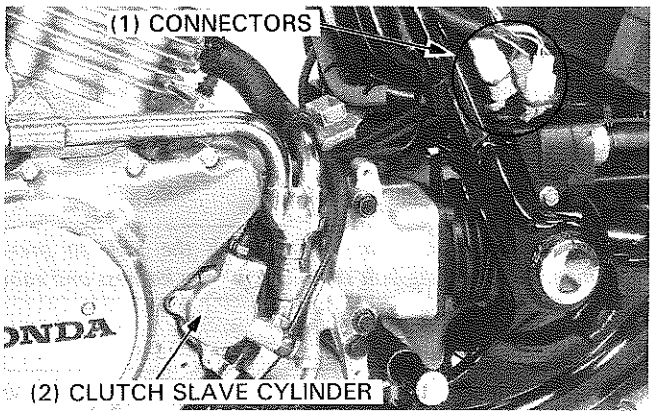
ENGINE REMOVAL

Place the motorcycle on its centerstand.
Drain the engine oil (page 2-3) and radiator coolant (page 6-3).

Remove the following:
— fuel tank (page 4-12).
— air cleaner case (page 4-13).
— carburetor (page 4-3).
— radiator (page 6-5).
— spark plug caps.
— left footpeg and gearshift pedal (page 8-2).
— right and left exhaust pipes.
— right and left side covers and center cover.
— horn and thermostat housing
— rear brake pedal and right foot peg (page 7-10).
— left crankcase rear cover.
Disconnect the battery negative cable from the battery terminal.
Disconnect the pulse generator wire connector.
Remove the starter motor cables from the starter motor.



Disconnect the stator wire connector and neutral, overdrive and oil pressure switch wire connectors.
Remove the clutch slave cylinder by removing the three bolts from the left crankcase cover.



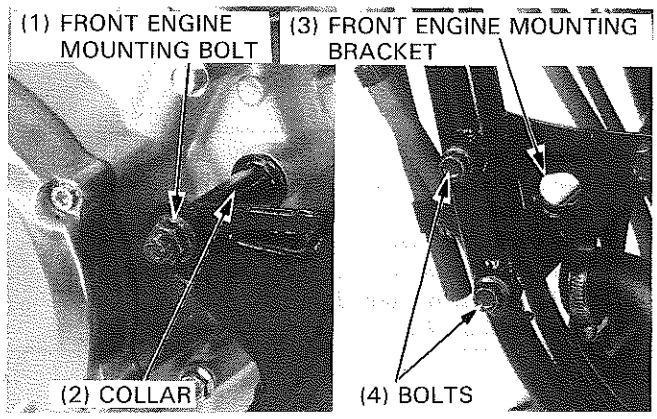
Place a floor jack or other adjustable support under the engine.

NOTE

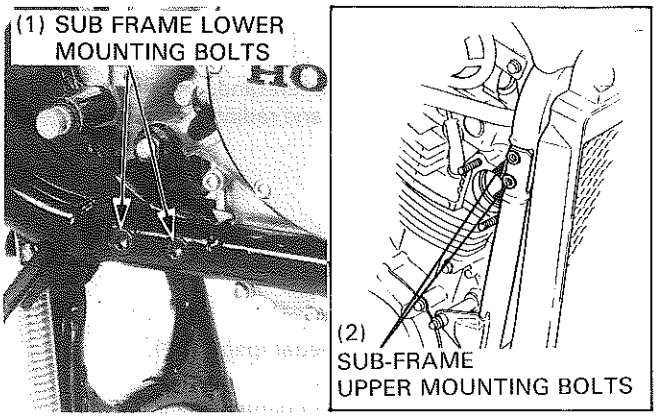
- The jack height must be continually adjusted to relieve stress for ease of bolt removal.

Remove the front engine mounting bolt collar and bolt.

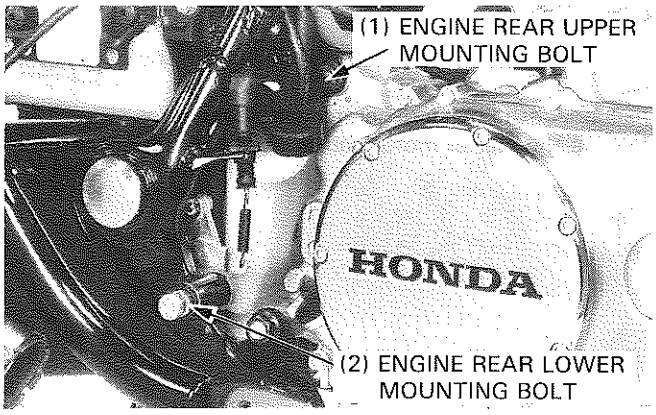
Remove the front engine mounting bracket bolts and front engine mouning bracket.



Remove the sub-frame upper and lower mounting bolts and sub-frame.



Remove the engine rear upper and lower mounting bolts and collars.
Remove the engien from right side.



ENGINE INSTALLATION

Engine installation is essentially the reverse order of removal. Use a floor jack or other adjustable support to carefully manuever the engine into place.

CAUTION

- *Carefully align mounting points with the jack to prevent damage to mounting bolt threads and wire harness and cables.*

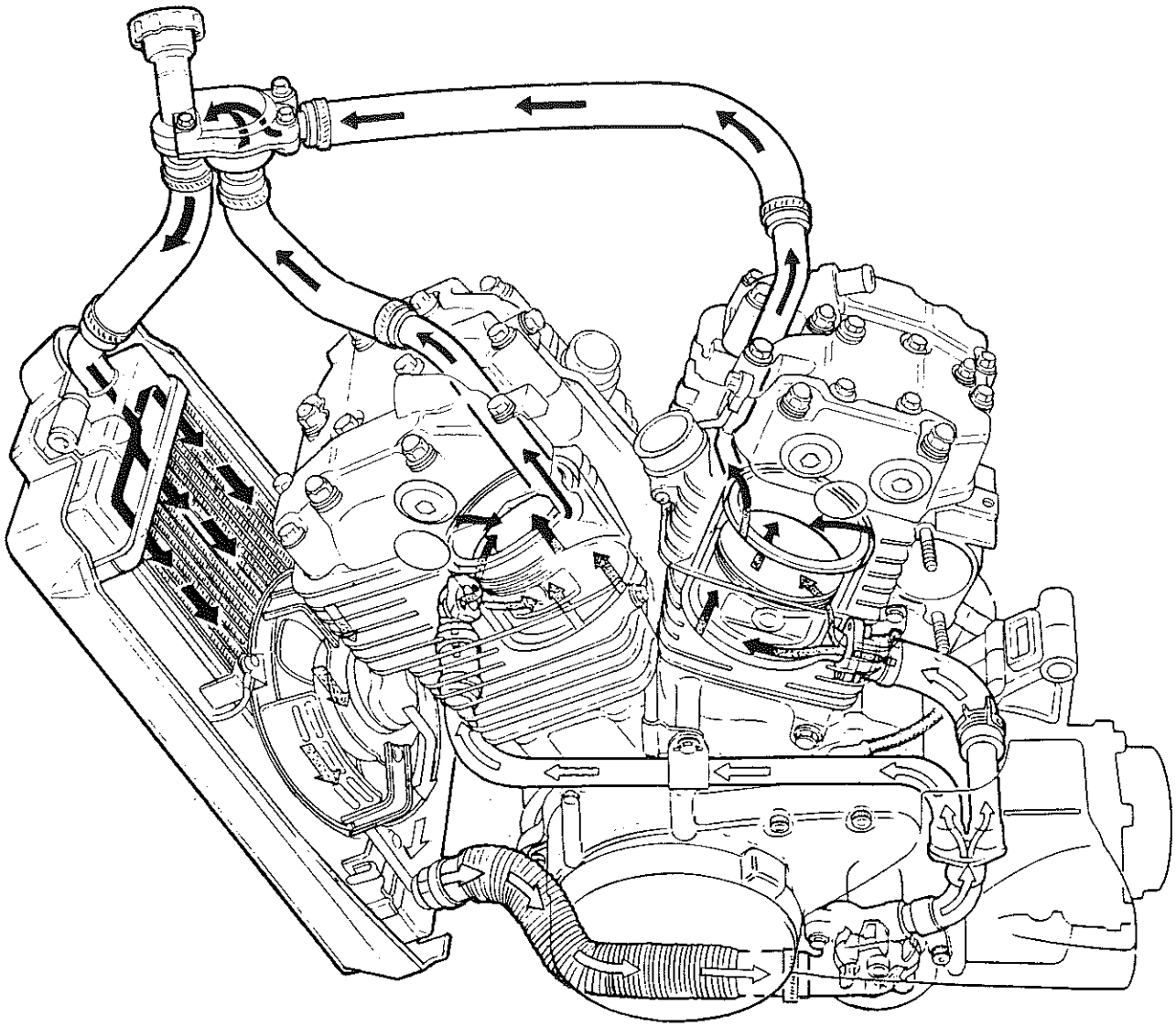
NOTE

- Be sure to install the mounting collars to their correct positions.

Tighten all the fasteners to the specified torque given on pages 5-0 and 5-1.

NOTE

- Route the wires and cables properly (section 1).
- Fill the crankcase to the proper level with the recommended oil (page 2-1).
- Fill the cooling system (page 6-3).
- Perform the following inspection and adjustments:
  Throttle operation (page 3-5).
  Clutch (page 3-14).



SERVICE INFORMATION

GENERAL

WARNING

- *Do not remove the radiator cap when the engine is hot. The coolant is under pressure and severe scalding could result.*
- *The engine must be cool before servicing the cooling system.*

- Use only distilled water and ethylene glycol in the cooling system. A 50—50 mixture is recommended for maximum corrosion protection. Do not use alcohol-based antifreeze or an antifreeze with self sealing properties.
- Add coolant at the reserve tank. Do not remove the radiator cap except to refill or drain the system.
- Radiator, cooling fan and thermostat services can be made with the engine in the frame.
- Avoid spilling coolant on painted surfaces.
- After servicing the system, check for leaks with a cooling system tester.
- Refer to Section 21 for fan motor thermostatic switch and temperature sensor inspections.

SPECIFICATIONS

Radiator cap relief pressure	0.75—1.05 kg/cm^2 (10.7—14.9 psi)
Freezing point (Hydrometer test):	55% Distilled water + 45% ethylene glycol: −32°C (−25°F) 50% Distilled water + 50% ethylene glycol: −37°C (−34°F) 45% Distilled water + 55% ethylene glycol: −44.5°C (−48°F)
Coolant capacity: Radiator and engine Reserve tank Total system	 1.56 liters (1.64 US qt, 1.37 Imp qt) 0.27 liters (0.28 US qt, 0.24 Imp qt) 1.83 liters (1.92 US qt, 1.61 Imp qt)
Thermostat	Begins to open: 80° to 84°C (176° to 183°F) Valve lift: Minimum of 8 mm at 95°C (0.315 in at 203°F)
Boiling point (with 50—50 mixture):	Unpressurized: 107.7°C (226°F) Cap on, pressurized: 125.6° (258°F)

TROUBLESHOOTING

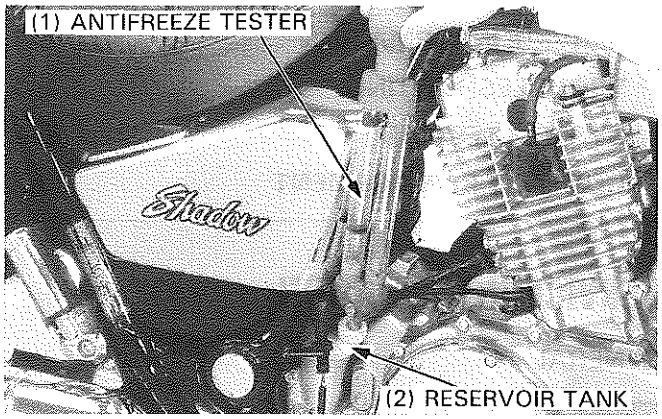
Engine temperature too hight

- Faulty temperature gauge or gauge sensor
- Thermostat stuck closed
- Faulty radiator cap
- Insufficient coolant
- Passages blocked in radiator, hoses, or water jacket
- Bent fan blades
- Faulty fan motor
- Air bubbles in cooling system

SYSTEM TESTING

COOLANT

Remove the coolant reservoir cap.
Test the coolant mixture with an antifreeze tester. For maximum corrosion protection, a 50—50% solution of ethylene glycol and distilled water is recommended.

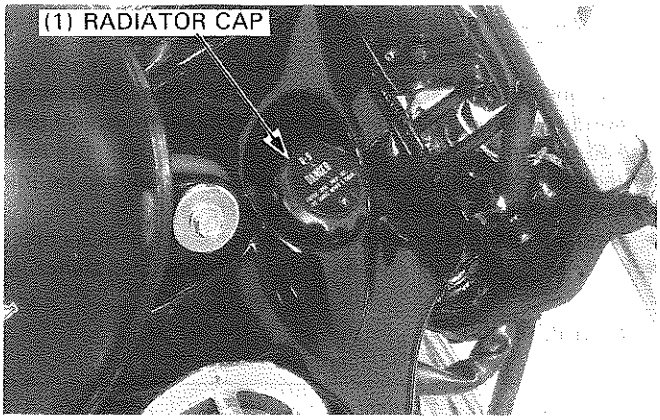


RADIATOR CAP/SYSTEM INSPECTION

Remove the radiator cap cover and radiator cap.

WARNING

- ***The engine must be cool before removing the radiator cap, or severe scalding may result.***

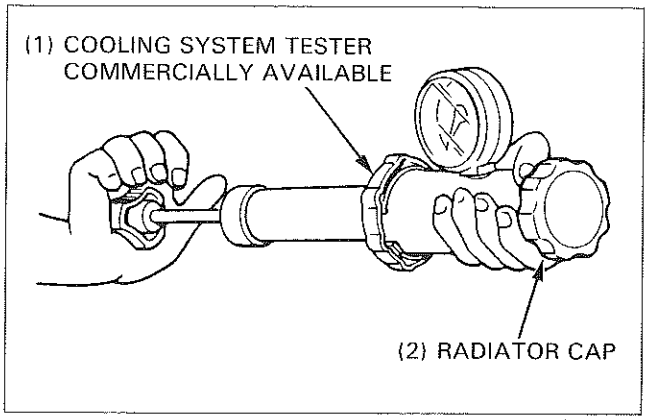


Pressure test the radiator cap. Replace the radiator cap if it does not hold pressure, or if relief pressure is too high or too low. It must hold specified pressure for at least six seconds.

NOTE

- Before installing the cap on the tester, wet the sealing surfaces.

RADIATOR CAP RELIEF PRESSURE:
0.75—1.05 kg/cm² (10.7—14.9 psi)

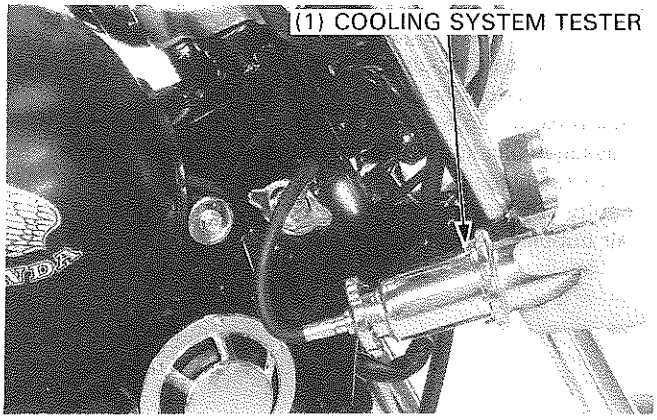


Pressurize the radiator, engine and hoses, and check for leaks.

CAUTION

- *Excessive pressure can damage the radiator. Do not exceed 1.05 kg/cm² (14.9 psi)*

Repair or replace components if the system will not hold specified pressure for at least six seconds.



COOLANT REPLACEMENT

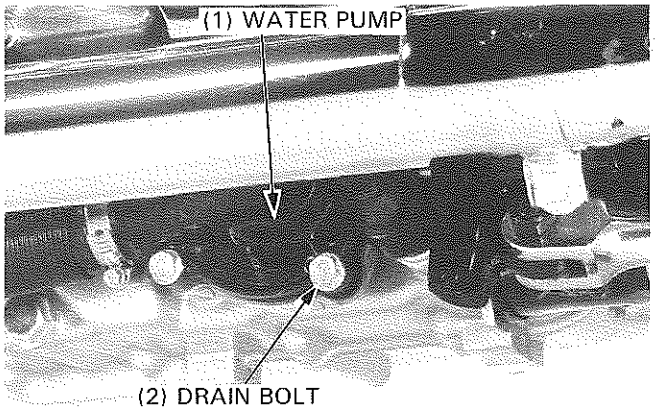
WARNING

- ***The engine must be cool before servicing the cooling system, or severe scalding may result.***

Remove the radiator cap cover and radiator cap.

Remove the drain bolt located at the water pump and drain the system coolant.

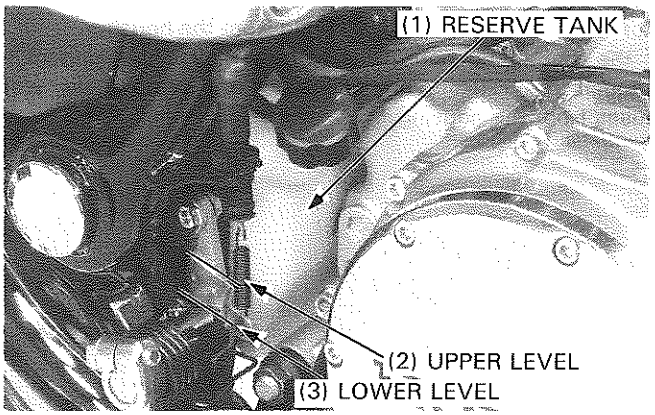
Replace the drain bolt if desired.



Fill the system with a 50—50 mixture of distilled water and ethylene glycol.

Bleed the air from the radiator as follows:

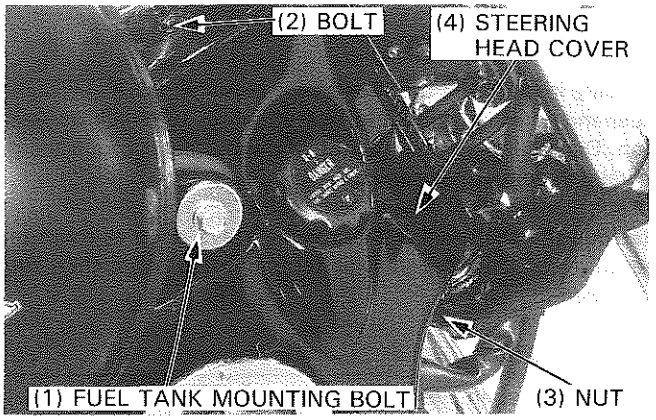
- Start the engine and run until there are no air bubbles in the coolant, and the level stabilizes.
- Stop the engine and add coolant up to the proper level if necessary.
- Reinstall the radiator cap.
- Check the level of coolant in the reserve tank and fill to the correct level if it is low.



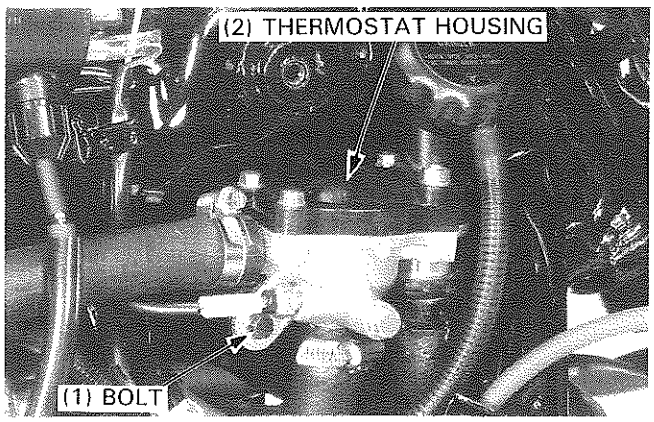
THERMOSTAT

REMOVAL

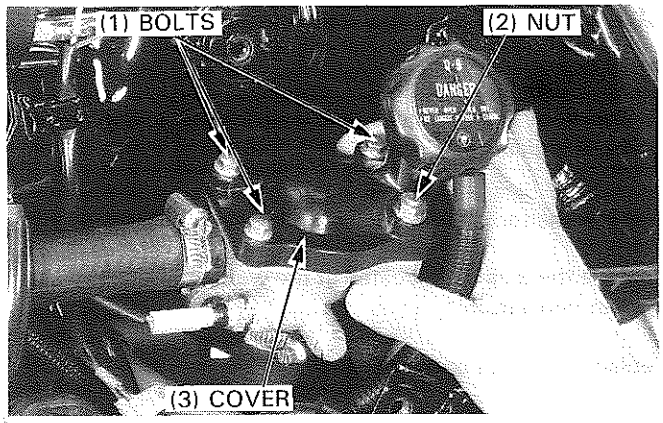
Drain the coolant.
Remove the fuel tank mount bolts and raise the fuel tank.
Remove the steering head cover by removing the bolt and nut.



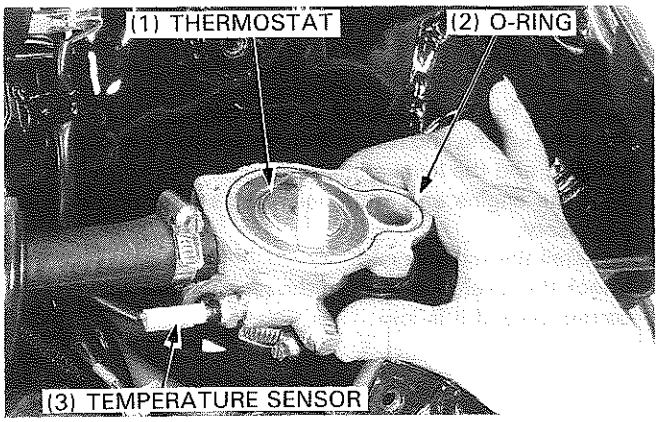
Remove the thermostat housing mounting bolt.



Remove the thermostat housing cover by removing the three bolts and nut.



Remove the thermostat and O-ring from the housing.
If the thermostat housing is to be removed, disconnect the temperature sensor wire conncetor and remove the water hoses from the housing.



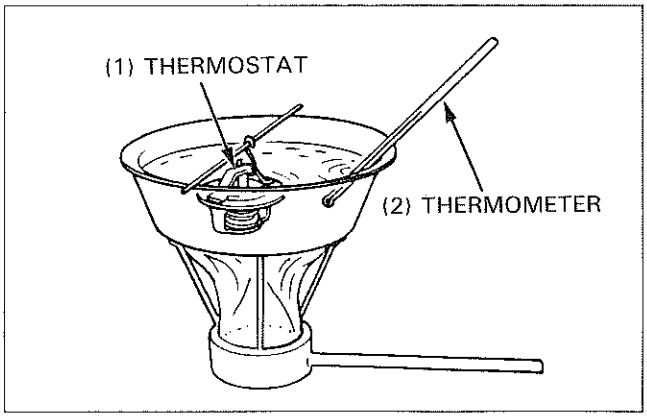
INSPECTION

Visually inspect the thermostat for damage.
Suspend the thermostat in heated water to check its operation. Do not let the thermostat or thermometer touch the pan or false readings will result.

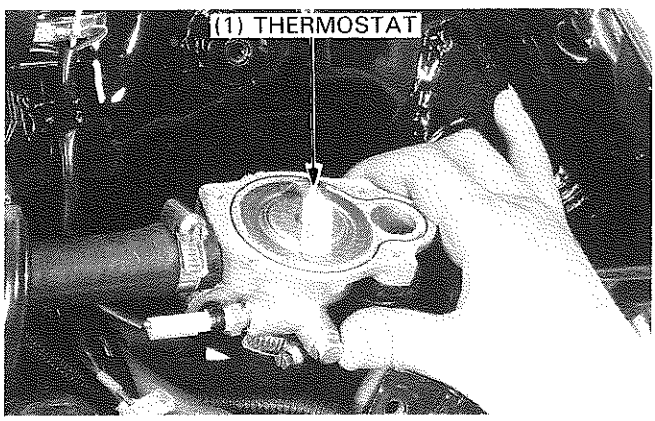
Replace the thermostat if the valve stays open at room temperature, or if it responds at temperatures other than those specified.

Technical Data

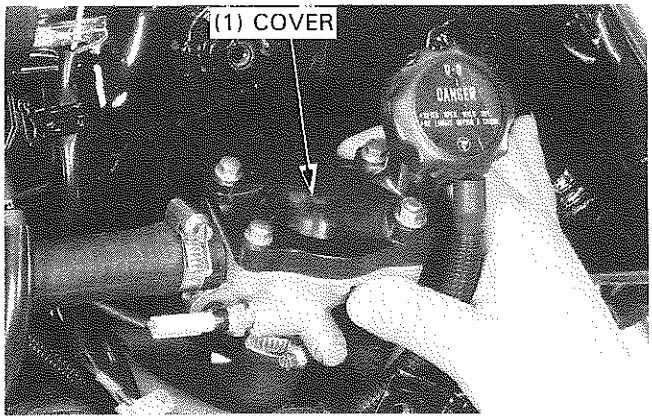
Starts to open	80° to 84°C (176° to 183°F)
Valve lift	8 mm minimum (0.31 in) when heated to 95°C (203°F) for five minutes.



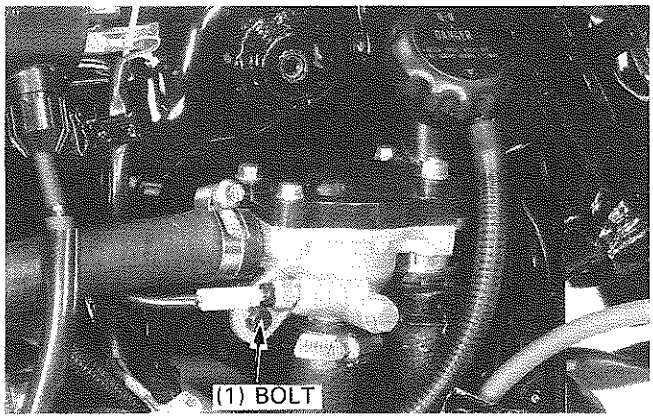
Install the thermostat into the housing, aligning the rib of the thermostat with the slot in the housing.
Install a new O-ring onto the thermostat housing.



Install the thermostat housing cover with three bolts and nut, and tighten them.



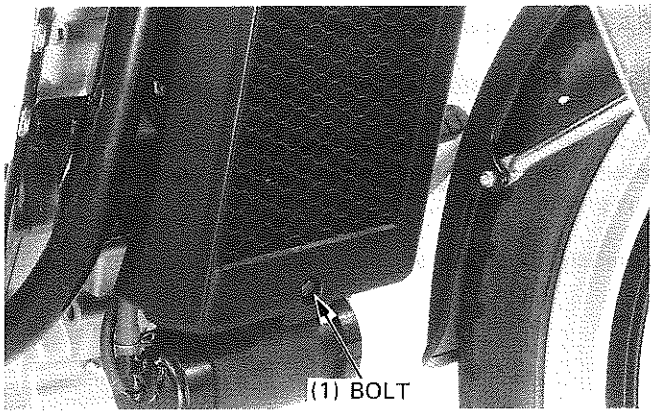
Install and tighten the thermostat housing bolt.



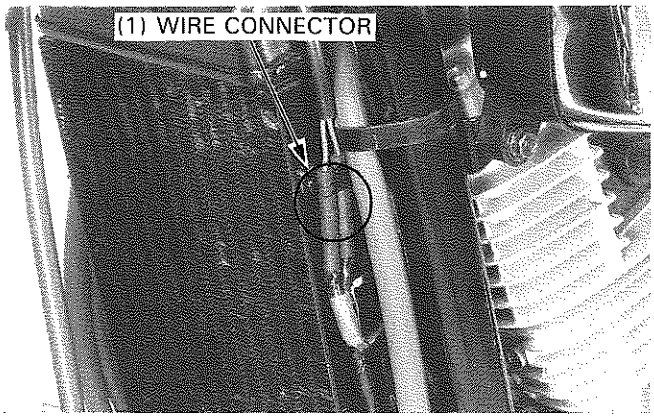
RADIATOR/COOLING FAN

REMOVAL

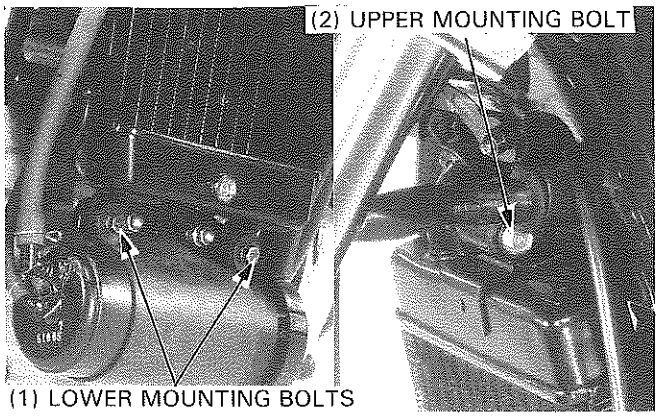
Drain the radiator coolant (page 6-3).
Remove the radiator cover bolt and cover.



Disconnect the cooling fan motor wire connectors and thermostatic switch wire.

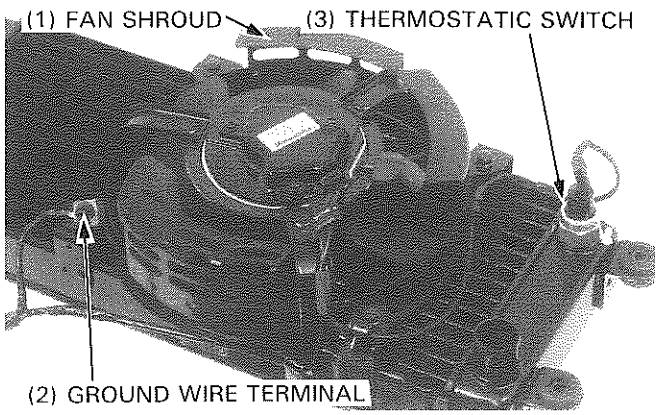


Disconnect the upper and lower radiator hoses from the radiator.
Remove the two lower radiator mounting bolts.
Remove the upper radiator mounting bolt and radiator.



DISASSEMBLY

Disconnect the thermostatic switch wire connector from the switch and remove the wire from the clamp.
Remove the ground wire terminal bolt.
Remove the radiator shroud with the cooling fan by removing the four bolts.

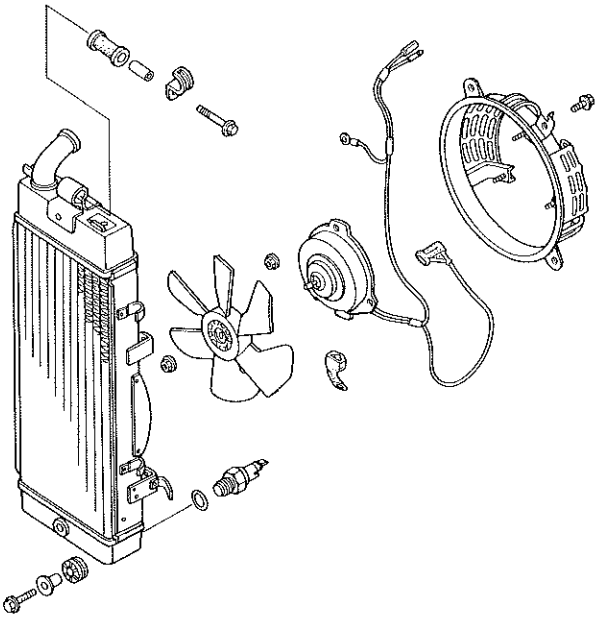


RADIATOR INSPECTION

Inspect the radiator soldered joints and seams for leaks.

Blow dirt out from between core fins with compressed air. If insects, etc., are clogging the radiator, wash them off with low pressure water.

Carefully straighten any bent fins.



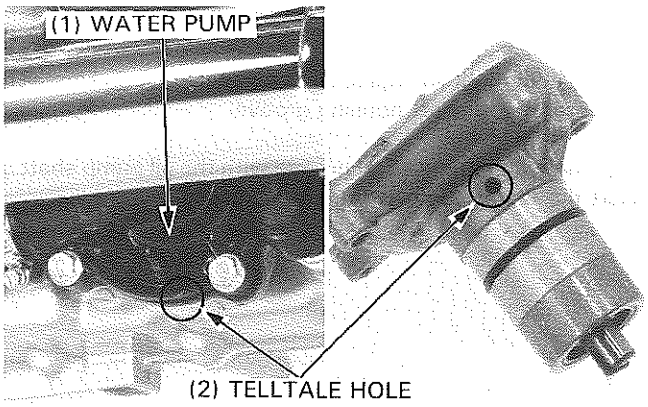
ASSEMBLY/INSTALLATION

Assemble and install the radiator in the reverse order of disassembly/removal.

WATER PUMP

MECHANICAL SEAL INSPECTION

Inspect the telltale hole for signs of coolant leakage. Replace the water pump as an assembly if the mechanical seal is leaking.



REMOVAL

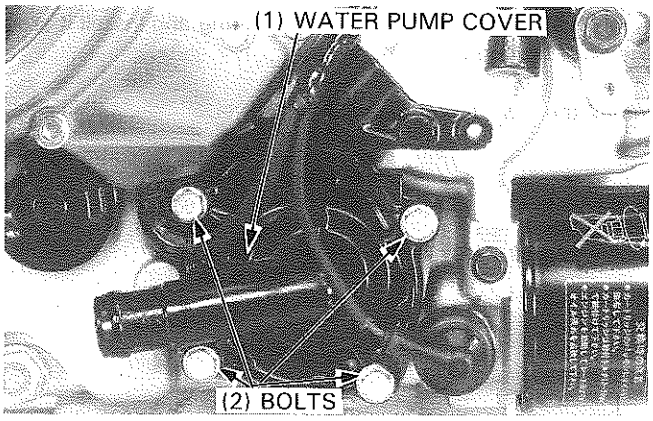
Remove the engine from the frame (section 5).

Remove the water hoses and water pipe from the engine.

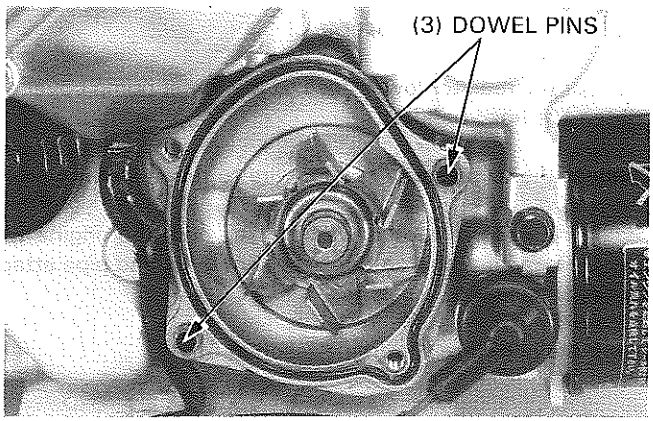
Disconnect the oil pressure switch wire.

Loosen the hose band and disconnect the radiator lower hose from the water pump.

Remove the water pump cover bolts and cover.

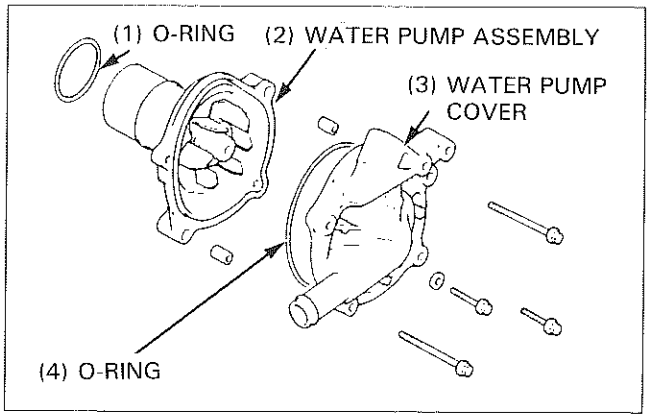


Remove the water pump from the crankcase.



INSPECTION

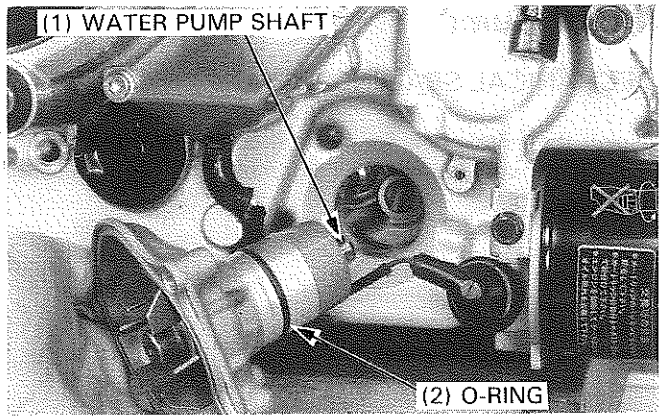
Check the water pump for mechanical seal leakage and bearing deterioration. Replace the water pump as an assembly if necessary.



INSTALLATION

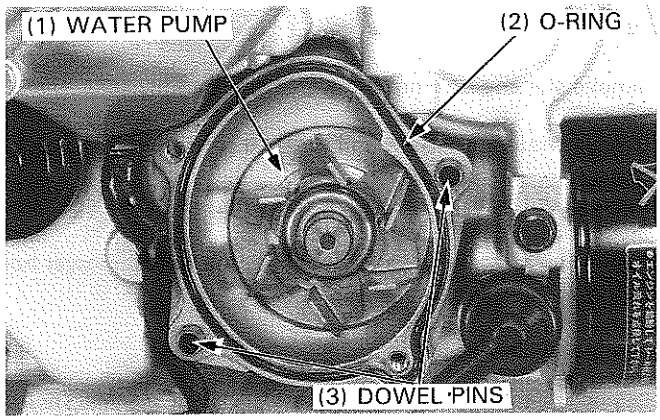
Apply a coat of clean engine oil to a new O-ring and install it in the water pump shaft housing groove.

Align the water pump shaft groove with the oil pump shaft and insert the water pump into the crankcase.



Apply a coat of engine oil to a new O-ring and install it around the impeller housing.

Install the two dowel pins.



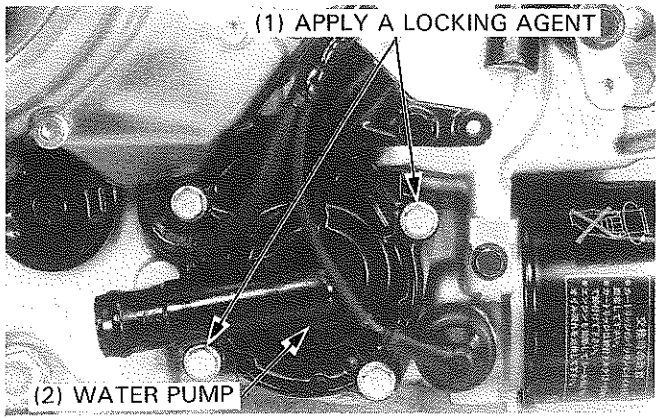
Install the water pump cover.

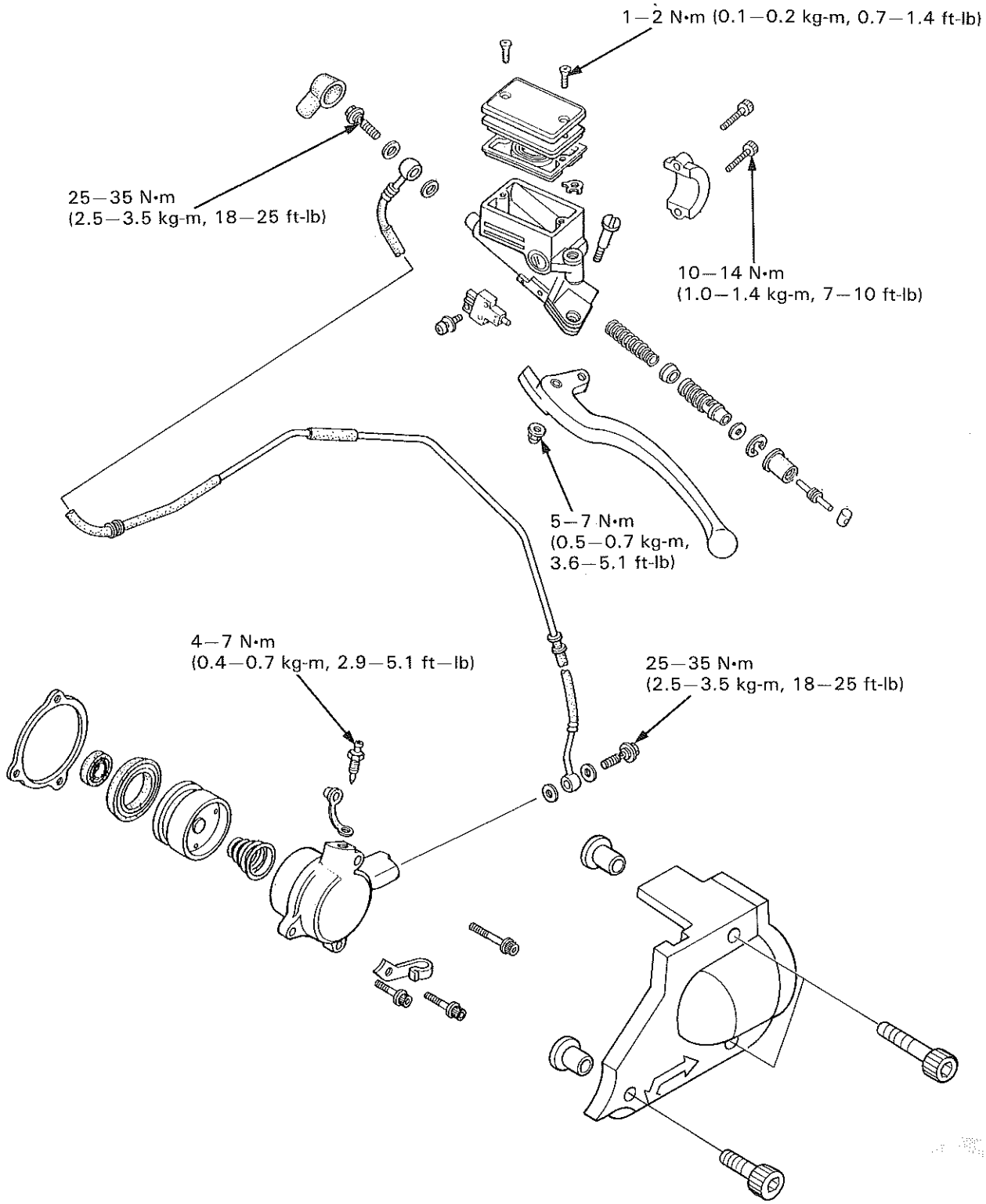
Connect the radiator lower hose to the water pump cover and tighten the hose band.

Connect the oil pressure switch wire to the switch.

Install the water pipe and water hoses onto the engine with new O-rings, and tighten the hose joint bolts and pipe attaching bolts securely.

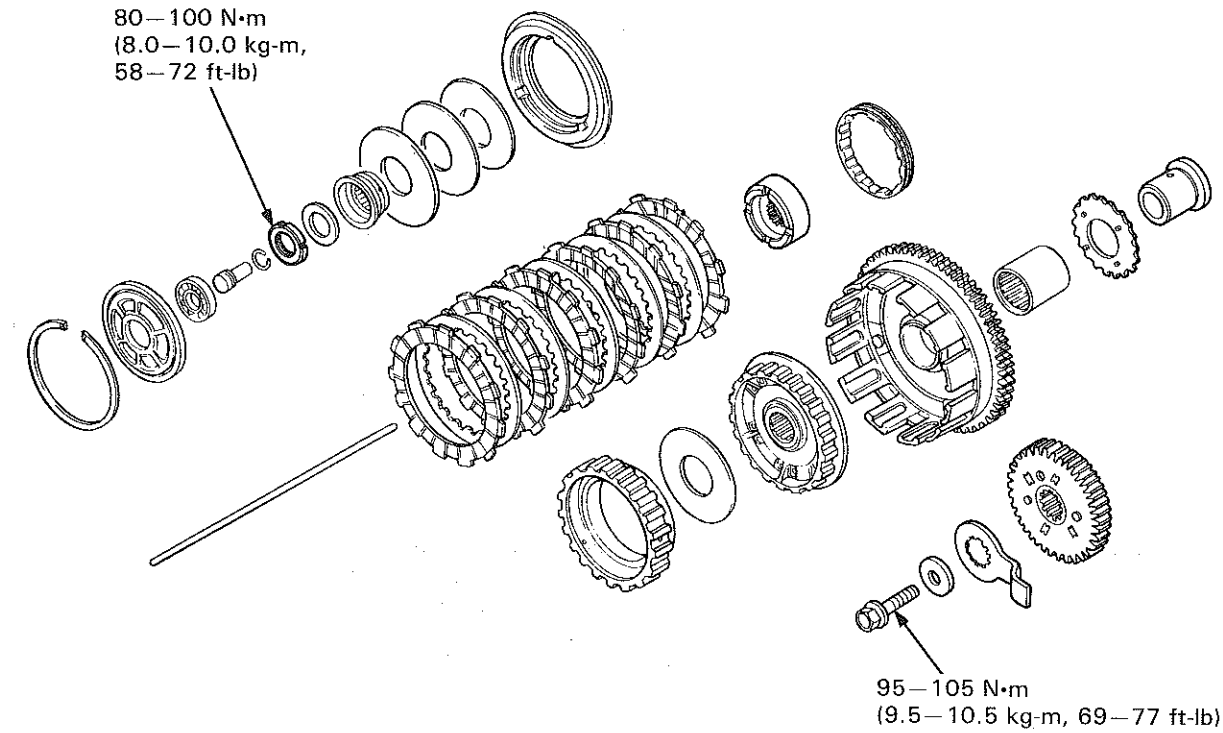
Install the engine in the frame (section 5).

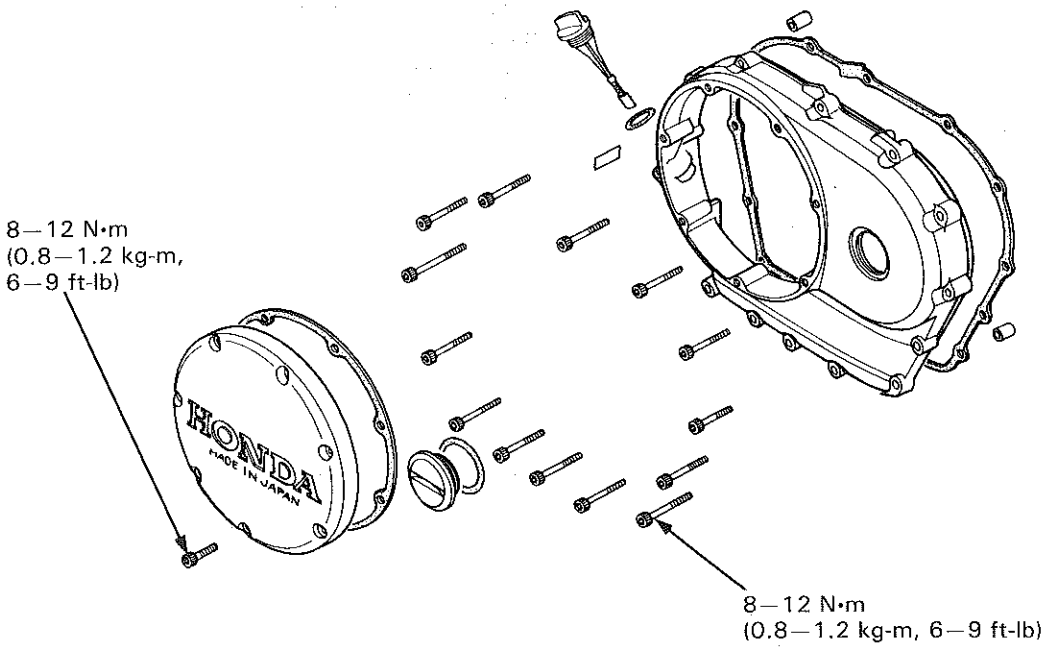



1—2 N·m (0.1—0.2 kg-m, 0.7—1.4 ft-lb)
25—35 N·m
(2.5—3.5 kg-m, 18—25 ft-lb)
10—14 N·m
(1.0—1.4 kg-m, 7—10 ft-lb)
5—7 N·m
(0.5—0.7 kg-m,
3.6—5.1 ft-lb)
4—7 N·m
(0.4—0.7 kg-m, 2.9—5.1 ft—lb)
25—35 N·m
(2.5—3.5 kg-m, 18—25 ft-lb)

7. CLUTCH SYSTEM

'86 shown:





SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the clutch hydraulic system, clutch and primary drive gear.
- DOT 3 or DOT 4 brake fluid is used for the hydraulic clutch and is referred to as clutch fluid in this section. Do not use other types of fluid as they are not compatible.
- Clutch maintenance can be done with the engine installed in the frame.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Clutch master cylinder	Cylinder I.D.	14.000—14.043 (0.5512—0.5529)	14.06 (0.554)
	Piston O.D.	13.957—13.984 (0.5495—0.5506)	13.94 (0.549)
Clutch slave cylinder	Cylinder I.D.	38.100—38.162 (1.5000—1.5024)	38.18 (1.503)
	Piston O.D.	38.036—38.075 (1.4975—1.4990)	38.02 (1.497)
Clutch	'86: Spring free height	3.9 (0.15)	3.6 (0.14)
	After '86: Spring free length	35.5 (1.40)	35.0 (1.38)
	'86: Clutch center B I.D.	74.414—74.440 (2.9297—2.9307)	74.50 (2.933)
	'86: One way clutch inner O.D.	57.710—57.840 (2.2720—2.2772)	57.60 (2.268)
	Disc thickness	3.72—3.88 (0.146—0.153)	3.1 (0.12)
	Plate warpage	——	0.30 (0.012)

TORQUE VALUES

Master cylinder holder bolt	10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)
Clutch oil bolt	25—35 N·m (2.5—3.5 kg-m, 18—25 ft-lb)
Clutch fluid reservoir cover	1—2 N·m (0.1—0.2 kg-m, 0.7—1.4 ft-lb)
Clutch lever pivot nut	5—7 N·m (0.5—0.7 kg-m, 3.6—5.1 ft-lb)
Clutch lock nut	80—100 N·m (8.0—10.0 kg-m, 58—72 ft-lb)
Clutch cover bolt	8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
Right crankcase cover bolt	8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
Primary gear bolt	95—105 N·m (9.5—10.5 kg-m, 69—77 ft-lb) apply oil to the threads.
Sub-frame bolt Front	60—70 N·m (6.0—7.0 kg-m, 43—51 ft-lb) apply oil to the threads.
Rear	35—45 N·m (3.5—4.5 kg-m, 25—33 ft-lb)
Exhaust pipe joint nut	8—14 N·m (0.8—1.4 kg-m, 6—10 ft-lb)
Muffler band bolt	18—28 N·m (1.8—2.8 kg-m, 13—20 ft-lb)
Exhaust pipe protector bolt	7—11 N·m (0.7—1.1 kg-m, 5—8 ft-lb)
Front engine mounting bracket bolt	30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)
Front engine mounting nut	45—60 N·m (4.5—6.0 kg-m, 33—43 ft-lb)

TOOLS

Special

Snap ring pliers	07914—3230001 or equivalent commercially available in U.S.A.
Shaft holder	07923—6890101

Common

Lock nut wrench	07716—0020203
Extension bar	07716—0020500 or equivalent commercially available in U.S.A.
Gear holder	07724—0010100 Not availble in U.S.A.
Driver	07749—0010000
Attachment, 37 x 40 mm	07746—0010200
Pilot, 35 mm	07746—0040800

TROUBLESHOOTING

Clutch lever soft or spongy
- Air bubbles in hydraulic system
- Low fluid level
- Leaking hydraulic system

Clutch lever pull too hard
- Sticking master cylinder piston
- Sticking slave cylinder piston
- Clogged hydraulic system

Clutch slips
- Sticking hydraulic system
- Worn discs
- Weak spring
- Faulty clutch hydraulic system

Clutch will not disengage
- Air bubbles in hydraulic system
- Low fluid level
- Leaking lifter hydraulic system
- Sticking lifter hydraulic system
- Warped plates

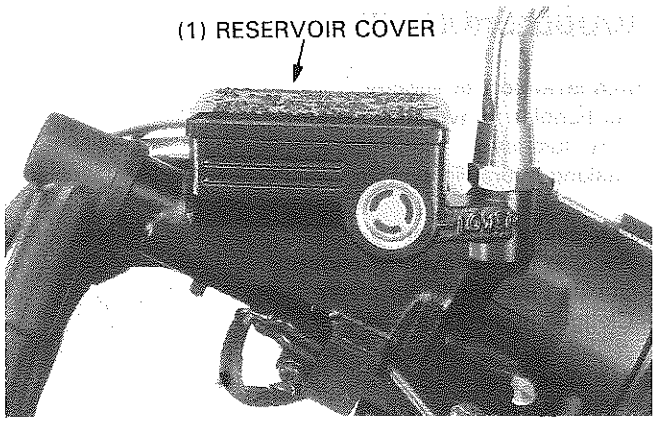
Motorcycle creeps with clutch disengaged
- Air bubbles in hydraulic system
- Low fluid level
- Leaking lifter hydraulic system
- Sticking lifter hydraulic system
- Warped plates

Clutch operation feels rough
- Rough outer drum slots
- Sticking master cylinder piston
- Sticking slave cylinder piston

CLUTCH FLUID REPLACEMENT/ AIR BLEEDING

CAUTION

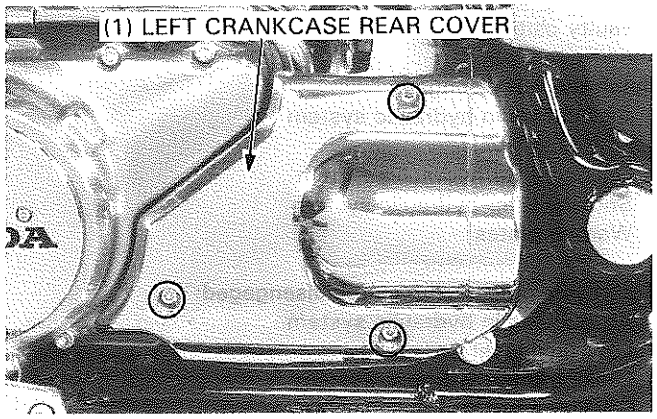
- *Do not allow foreign material to enter the system when the diaphragm is removed.*
- *Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*



CLUTCH FLUID DRAINING

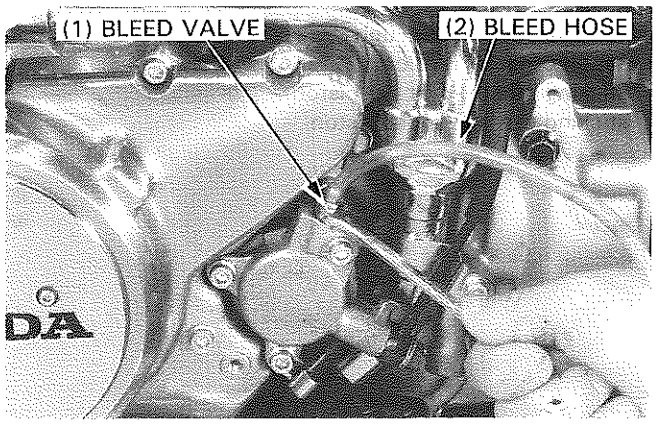
Remove the reservoir cover, set plate and diaphragm with the fluid reservoir parallel to the ground.

Remove the left crankcase rear cover.



Connect a bleed hose to the bleed valve.

Loosen the slave cylinder bleed valve and pump the clutch lever. Stop operating the lever when no more fluid flows out of the bleed valve.



CLUTCH FLUID FILLING/AIR BLEEDING

Fill the reservoir with DOT 3 or DOT 4 brake fluid from a sealed container to the upper level mark.

CAUTION

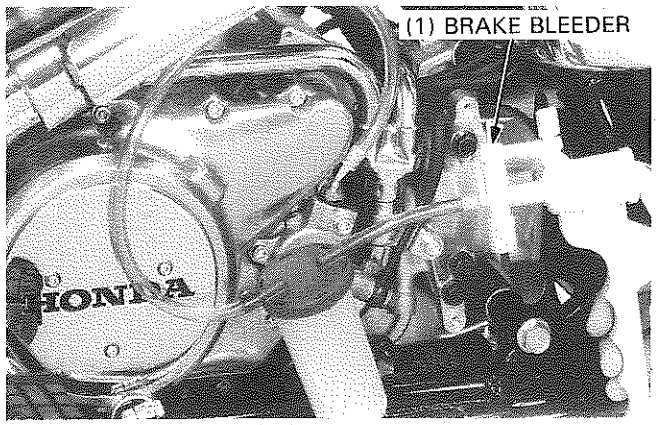
- *Do not mix different types of fluid. They are not compatible.*

Connect a commercially availale brake bleeder to the bleed valve.

Pump the brake bleeder and loosen the bleed valve.
Add fluid when the fluid level in the master cylinder reservoir is low.

NOTE

- Check the fluid level often while bleeding the clutch to prevent air from being pumped into the system.
- Use only DOT 3 or DOT 4 brake fluid from a sealed container.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



Repeat the above procedures until air bubbles do not appear in the plastic hose.

NOTE

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Close the bleed valve and operate the clutch lever. If it feels spongy, bleed the system using the previous procedure.

If a brake bleeder is not available, use the following procedure: Pump up the system pressure with the clutch lever until there are no air bubbles in the fluid flowing out of the reservoir small hole and lever resistance is felt.

Connect the bleed hose and bleed the system as follows:

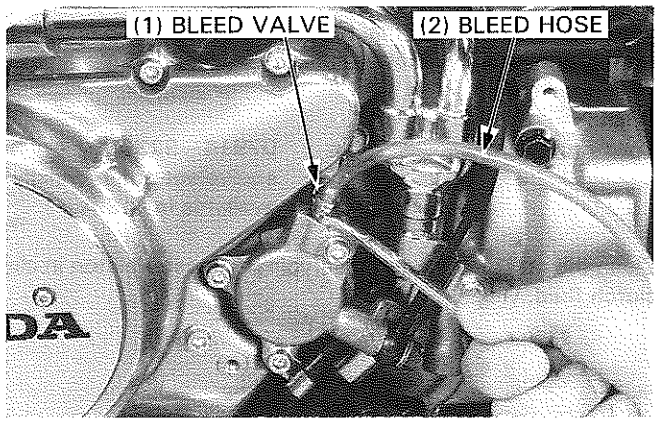
1. Squeeze the clutch lever, open the bleed valve 1/2 turn and then close the bleed valve.

NOTE

- Do not release the clutch lever until the bleed valve has been closed.

2. Release the clutch lever slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1 and 2 until air bubbles cease to appear in the fluid coming out of the bleed valve.

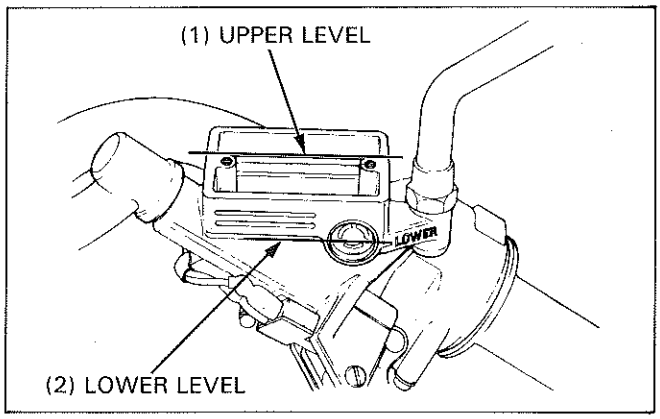


Tighten the bleed valve.

TORQUE: 4—7 N·m (0.4—0.7 kg-m, 2.9—5.1 ft-lb)

Fill the fluid reservoir to the upper level mark with DOT 3 or DOT 4 brake fluid from a sealed container.

Install the diaphragm, set plate and reservoir cover.



CLUTCH MASTER CYLINDER

DISASSEMBLY

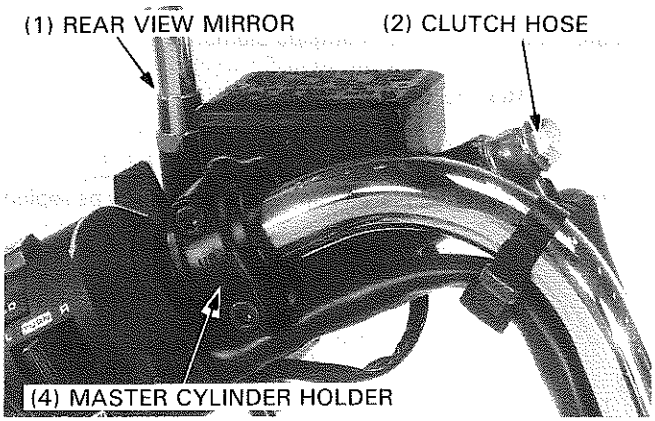
Drain the clutch fluid from the clutch hydraulic system (page 7-4).

Remove the rear view mirror.
Disconnect the clutch switch wires from the switch.
Remove the clutch hose from the master cylinder.

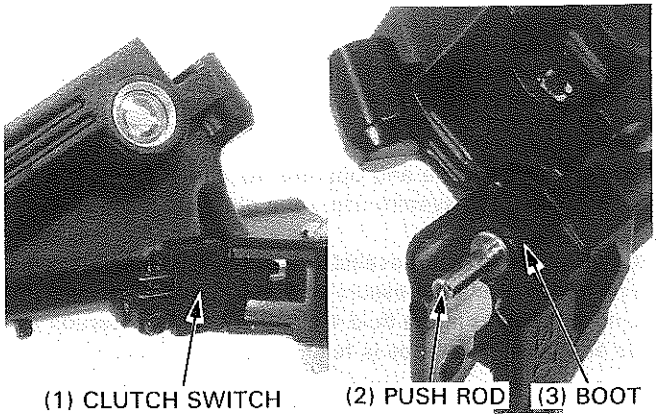
CAUTION

- *Avoid spilling fluid on painted, plastic, or rubber parts. Place a rag over these parts whenever the system is serviced.*
- *When removing the oil bolt, cover the end of the clutch hose to prevent contamination.*

Remove the master cylinder holder and master cylinder.



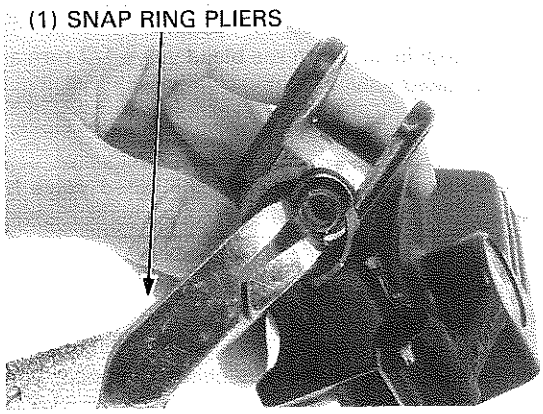
Remove the clutch lever, clutch switch, push rod and boot.



Remove the snap ring, master piston, primary cup and spring from the master cylinder.

TOOL:

Snap ring pliers	**07914—3230001 or equivalent commercially available in U.S.A.**



Clean the master cylinder, reservoir and master piston in clean clutch fluid.

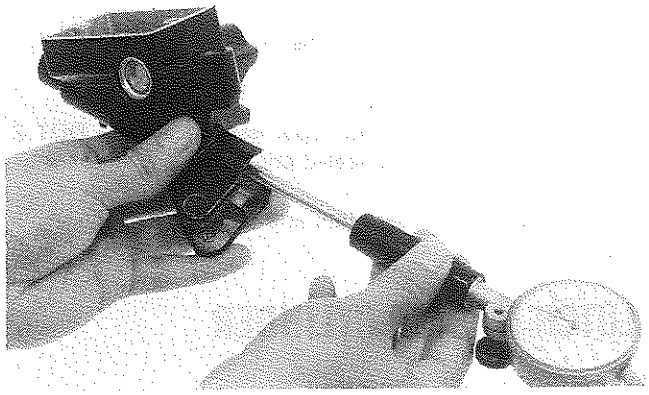
INSPECTION

Check the primary and secondary cups for wear, deterioration or damage.

Check the master cylinder and piston for scoring or other damage.

Measure the master cylinder inside diameter.

SERVICE LIMIT: 14.06 mm (0.554 in)

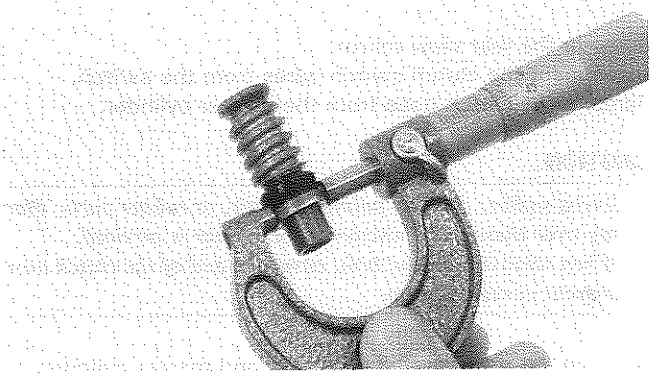


Measure the master piston outside diameter.

SERVICE LIMIT: 13.94 mm (0.549 in)

NOTE

- The master piston, piston cups and spring must be replaced as a set



ASSEMBLY

CAUTION

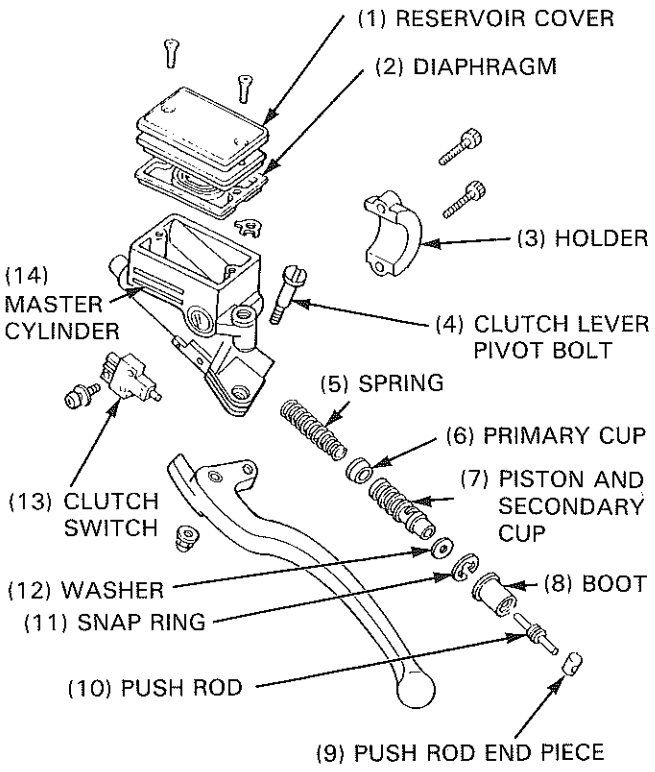
- *Handle the master piston, spring, primary cup and secondary cup as a set.*

Coat the master piston, primary and secondary cups with clean clutch fluid, then install the spring, primary cup and master piston into the master cylinder.

CAUTION

- *Do not allow the lips of the cups to turn inside and be certain the snap ring is firmly seated in the groove.*

Install the boot, push rod and clutch switch.

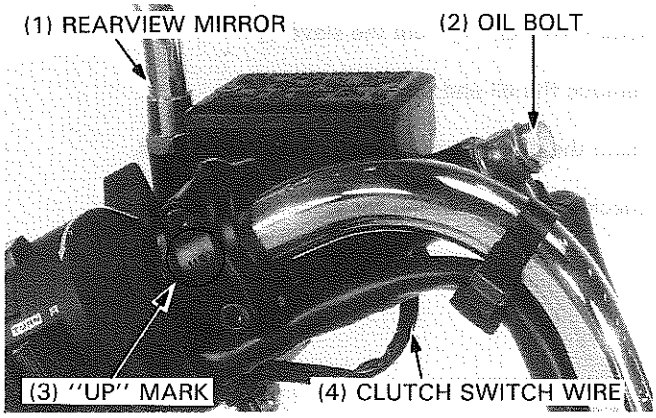


INSTALLATION

Place the clutch master cylinder on the handlebar and install the holder with the "UP" mark facing up.

Align the edge of the master cylinder holder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)



Install the clutch hose on the master cylinder with the oil bolt and new two sealing washers.
Tighten the oil bolt.

TORQUE: 25—35 N·m (2.5—3.5 kg-m, 18—25 ft-lb)

Connect the clutch switch wires to the switch.

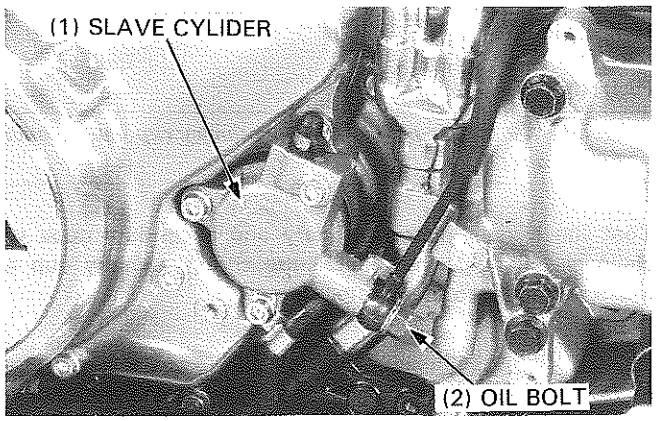
Install the clutch lever and rear view mirror.

Fill and bleed the clutch hydraulic system (page 7-4).

CLUTCH SLAVE CYLINDER

DISASSEMBLY

Remove the left crankcase rear cover.
Drain the clutch fluid from the clutch hydraulic system (page 7-4).
Remove the oil bolt and oil pipe from the slave cylinder.



CAUTION

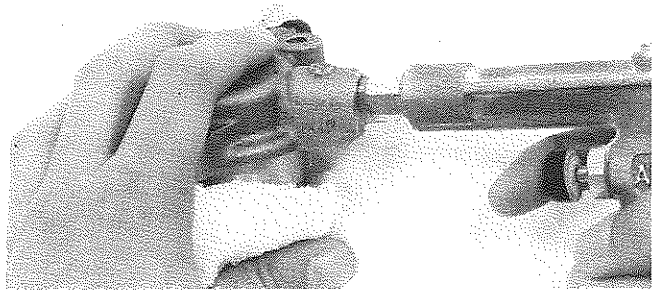
- *Avoid spilling clutch fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

Remove the slave cylinder.

Remove the piston from the cylinder.

If piston removal is difficult, place a shop towel over the piston to cushion the piston and position the cylinder with the piston down.

Apply compressed air to the fluid inlet to remove the piston. Use the air in short spurt.

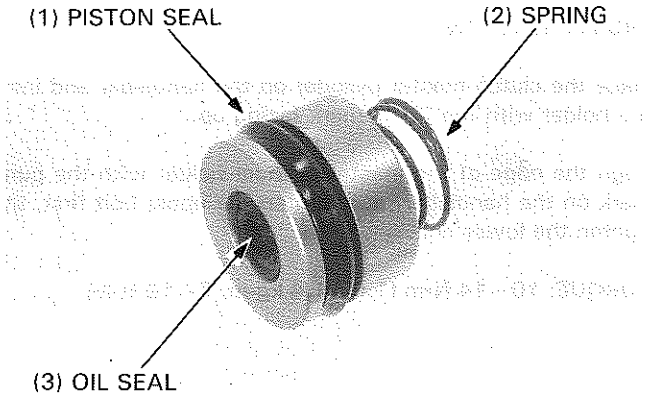


Remove the spring from the slave cylinder.

Remove the oil and piston seals.

Clean the piston groove with clean clutch fluid.

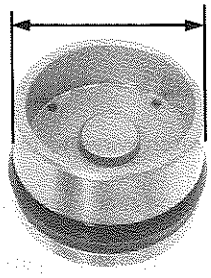
Check the piston spring for weakness or damage.



PISTON O.D. INSPECTION

Check the piston for scoring or damage.
Measure the outside diameter of the piston.

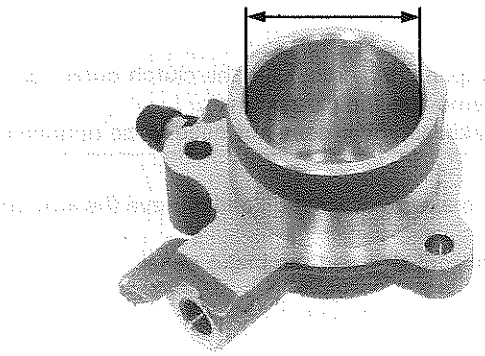
SERVICE LIMIT: 38.02 mm (1.497 in)



CYLINDER I.D. INSPECTION

Check the slave cylinder for scoring or damage.
Measure the inside diameter of the cylinder bore.

SERVICE LIMIT: 38.18 mm (1.503 in)

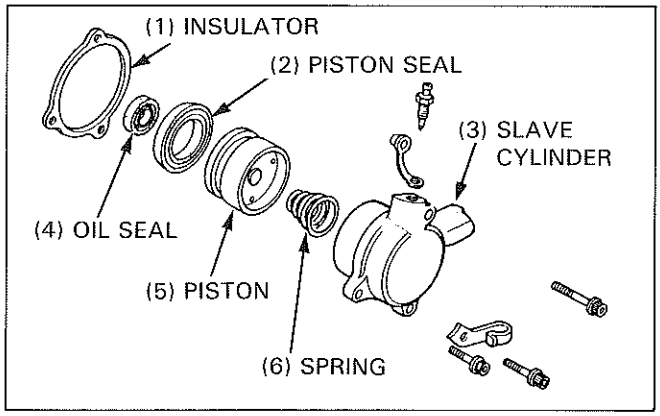


ASSEMBLY

Assemble the slave cylinder in the reverse order of disassembly. The seals must be replaced with new ones whenever they have been removed.

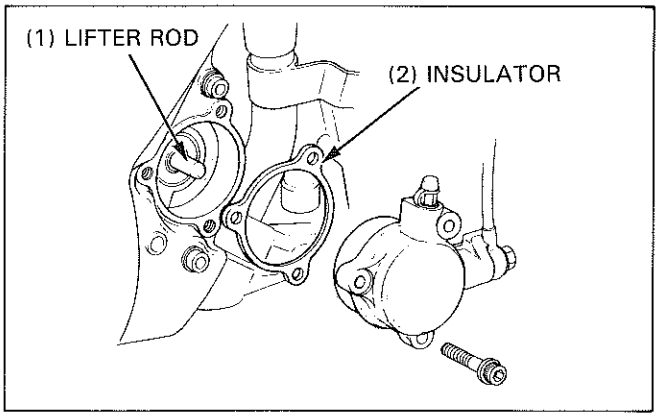
Lubricate the piston and piston seal with a medium grade of high temperature silicone grease or brake fluid before assembly.

Be certain the piston seal is seated in the piston groove. Place the piston in the cylinder with the oil seal end facing out.



Make sure that the clutch lifter rod is in position.

Install the insulator and slave cylinder.

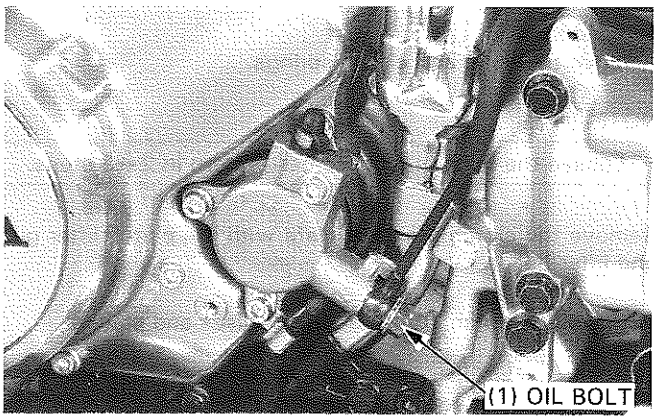


Connect the clutch hose with the oil bolt and the two new sealing washers.

Tighten the oil bolt.

TORQUE: 25—35 N·m (2.5—3.5 kg-m, 18—25 ft-lb)

Fill and bleed the clutch system (page 7-4).

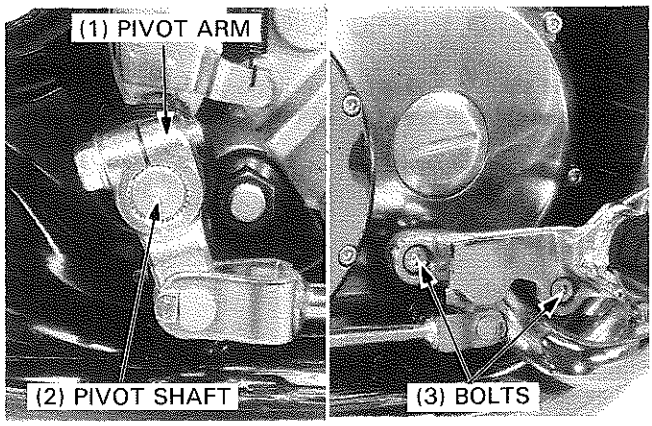


CLUTCH DISASSEMBLY

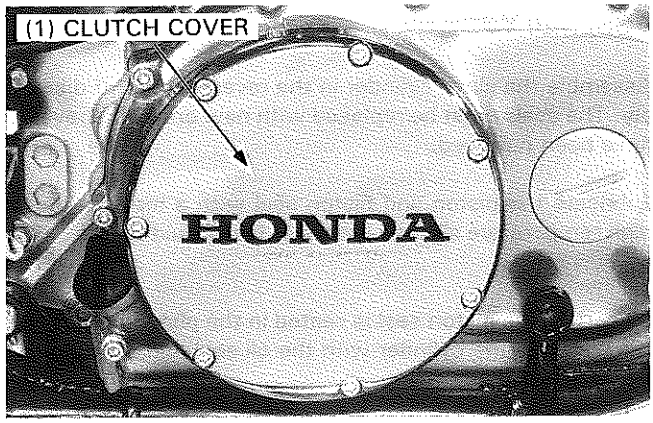
NOTE

- All clutch components, except for the clutch outer can be serviced by removing the clutch cover.
  The right crankcase cover does not need to be removed.

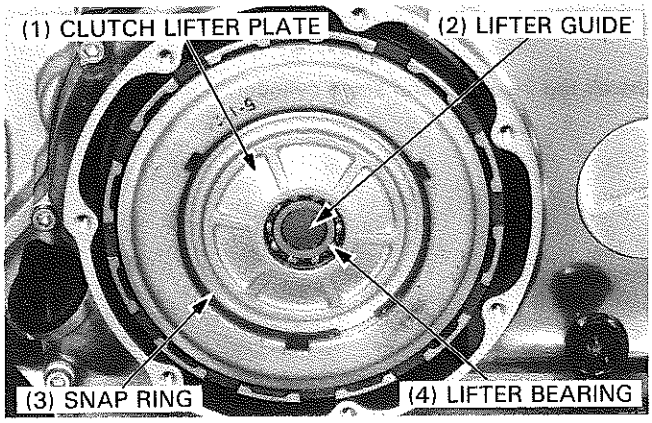
Remove the rear brake pivot arm bolt and remove the arm from the pivot shaft.
Remove the right foot peg and the brake pedal.



Drain the engine oil and remove the clutch cover and gasket.



'86 only:
Remove the snap ring, clutch lifter plate, bearing, lifter guide and lifter rod.



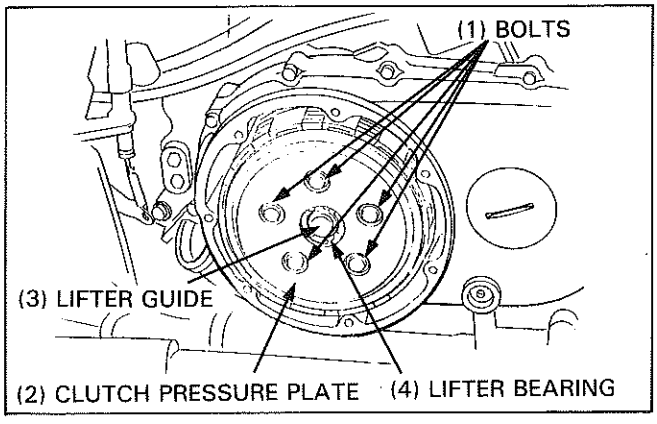
After '86:
Remove the bolts and clutch springs.

NOTE

- Loosen the bolts in a crisscross pattern in 2—3 steps.

Remove the clutch pressure plate with the clutch lifter guide and lifter bearing.

Remove the clutch lifter rod, clutch discs and plates.



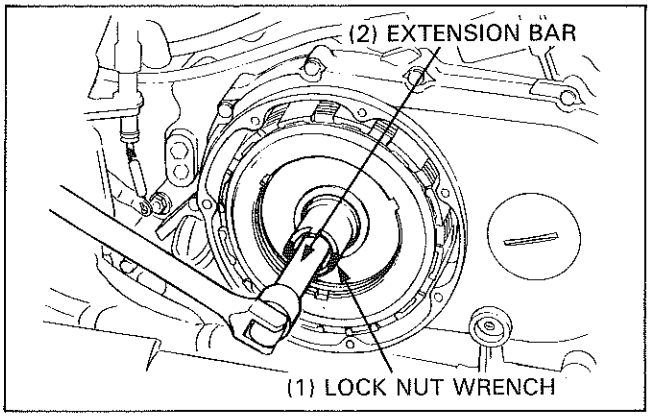
'86, After '86:
Shift the transmission into O.D. gear and apply the rear brake.

When the engine is not in the frame, shift the transmission into O.D. gear and hold the output driven shaft with a shaft holder (07923—6890100).
Remove the clutch lock nut.

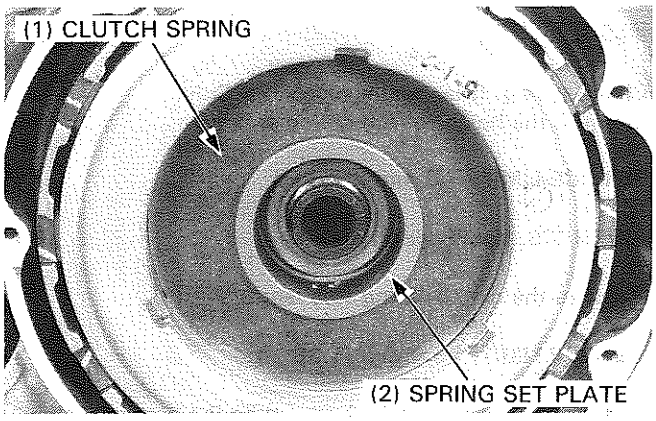
TOOLS:

Lock nut wrench	**07716—0020203**
Extension bar	**07716—0020500 or equivalent commercially available in U.S.A.**

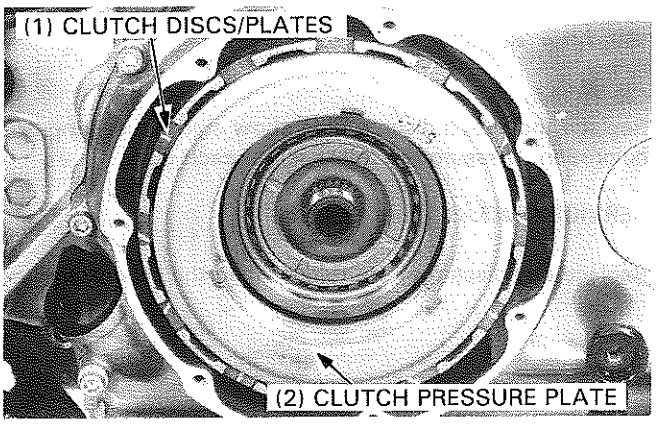
'86 shown:



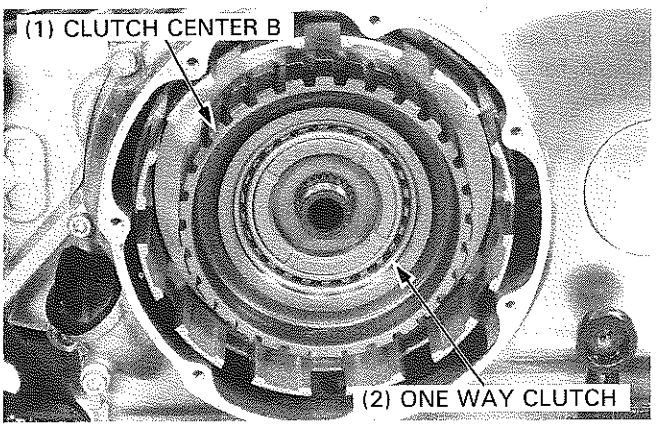
'86 only:
Remove the lock washer, clutch spring set plate, and two washers.



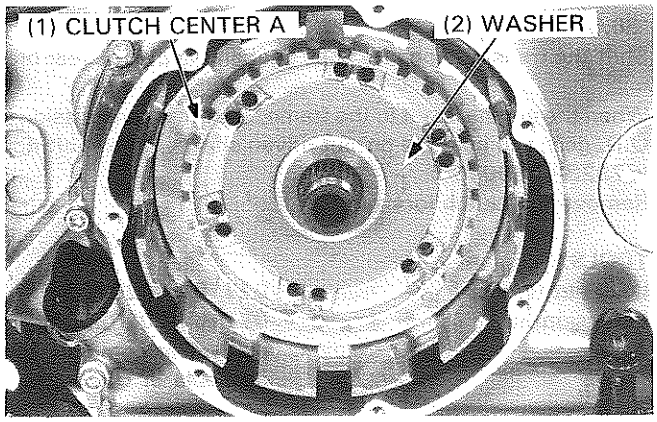
Remove the clutch pressure plate.
Remove the clutch plates and discs.



Remove clutch center B and the one-way clutch as an assembly.



Remove clutch center A and washer.



INSPECTION

Clutch spring: (Diaphragm type): '86 Only:
Measure the height of the clutch spring.

SERVICE LIMIT: 3.6 mm (0.14 in)

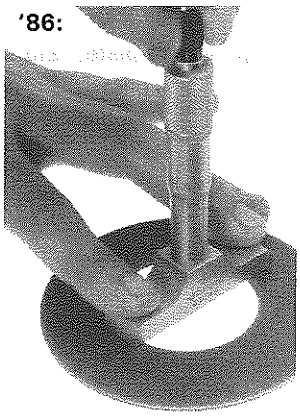
AFTER '86: (Coil spring type):

Measure the clutch spring free length.

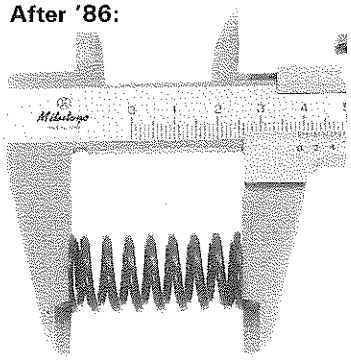
SERVICE LIMIT: 35.0 mm (1.38 in)

Replace the spring if it is shorter than the service limit.

'86:



After '86:

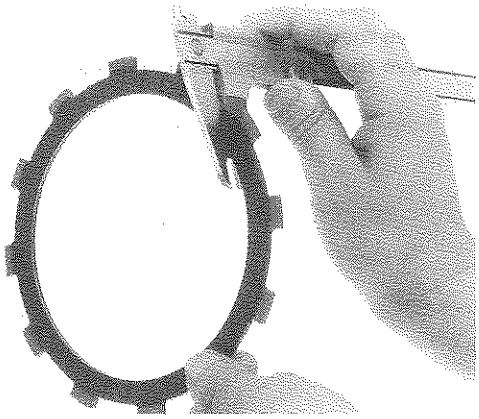


'86, After '86:

Clutch disc
Replace the clutch discs if they show signs of scoring or discoloration. Measure the thickness of each disc.

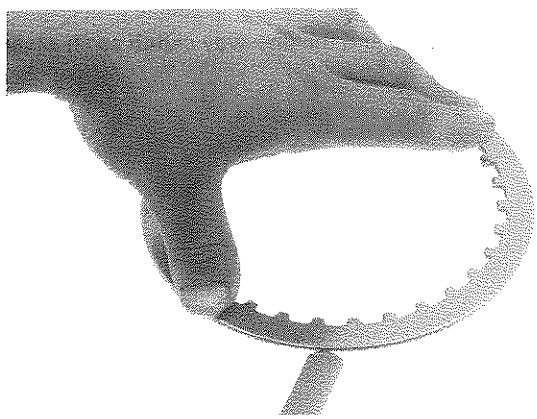
SERVICE LIMIT: 3.1 mm (0.12 in)

Replace any discs that are thinner than the service limit.



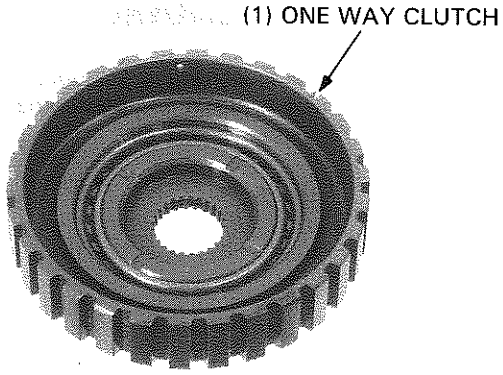
Clutch plate
Check for plate warpage on a surface plate, using a feeler gauge.

SERVICE LIMIT: 0.30 mm (0.012 in)



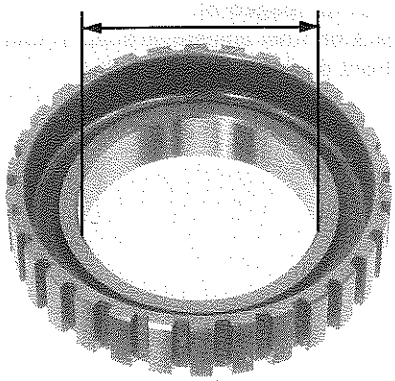
'86 only:

One way clutch
Inspect the one way clutch for smooth operation.
Check the rollers for excessive wear.



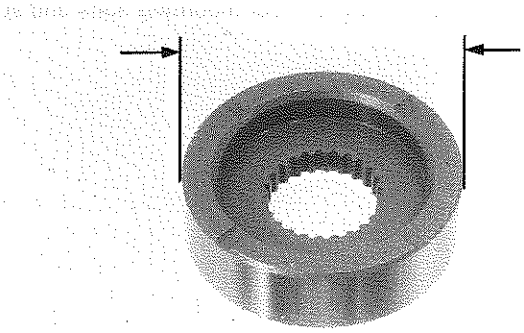
Measure the clutch center B inside diameter.

SERVICE LIMIT: 74.50 mm (2.933 in)

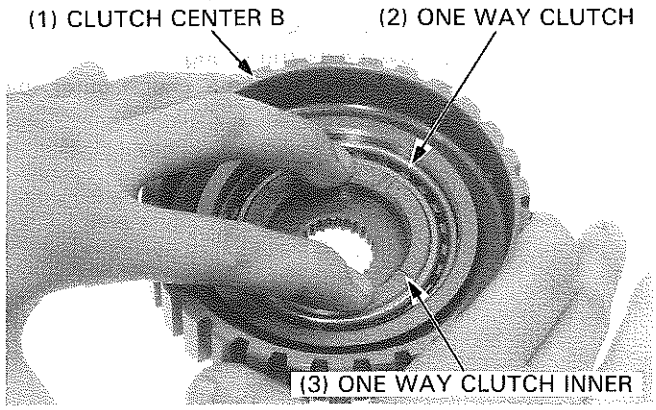


Measure the one way clutch inner's outside diameter.

SERVICE LIMIT: 57.60 mm (2.268 in)

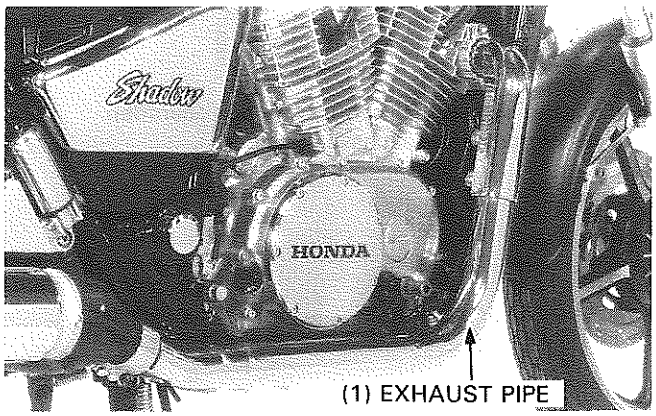


Assemble the one-way clutch.
Hold the one way clutch inner and turn clutch center B. Clutch center B should turn clockwise and should not turn counter-clockwise.

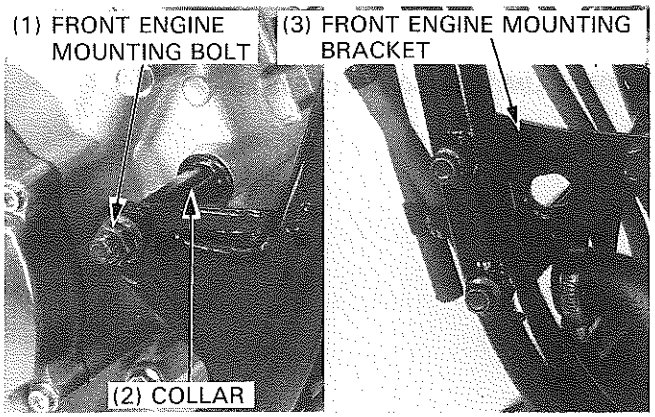


CLUTCH OUTER REMOVAL

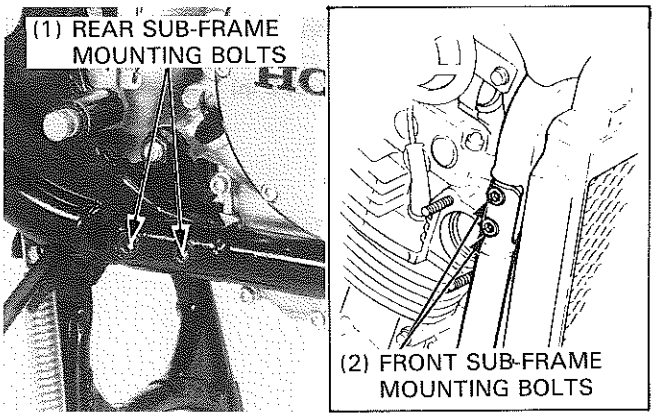
Remove the right exhaust protector, loosen the two clamp bolts and remove the joint nut and right exhaust pipe.



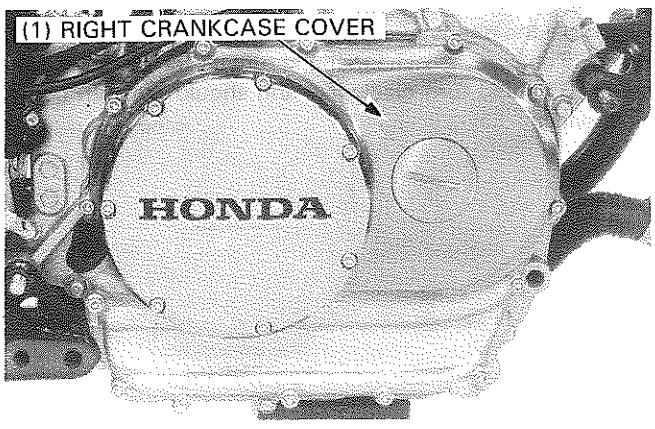
Remove the radiator (page6-5).
Place a floor jack or other adjustable support under the engine.
Remove the front engine mounting bolt.



Remove the sub-frame front and rear mounting bolts and sub-frame.

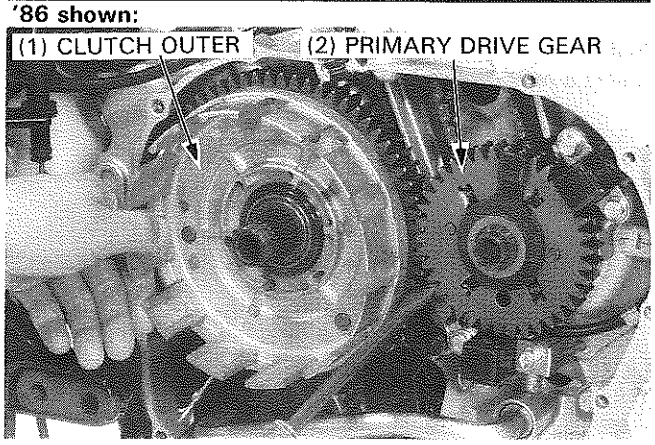


Remove the right crankcase cover.
Remove the gasket, dowel pins and O-ring
Remove the clutch assembly from the clutch outer (page 7-10).



Remove the clutch outer aligning the primary drive gear and sub-gear teeth with a screwdriver.

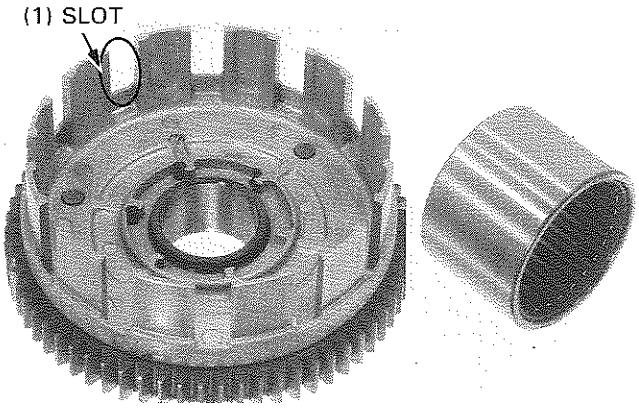
'86 shown:



INSPECTION

Check the slots in the clutch outer for nicks or indentations made by the clutch discs.
Check the clutch outer needle bearing for wear or damage. Replace the needle bearing with a new one if necessary.

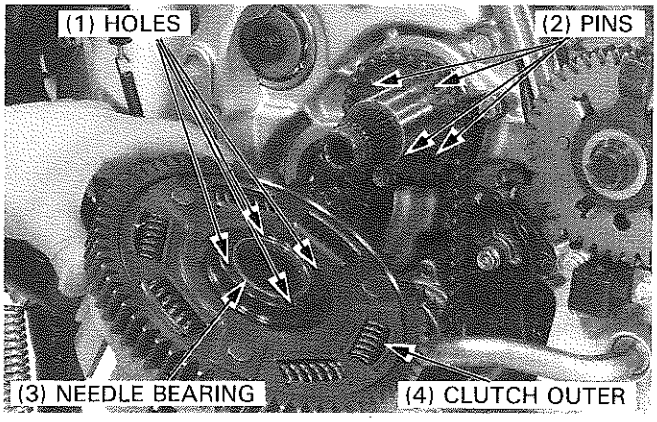
'86 shown:



CLUTCH OUTER INSTALLATION

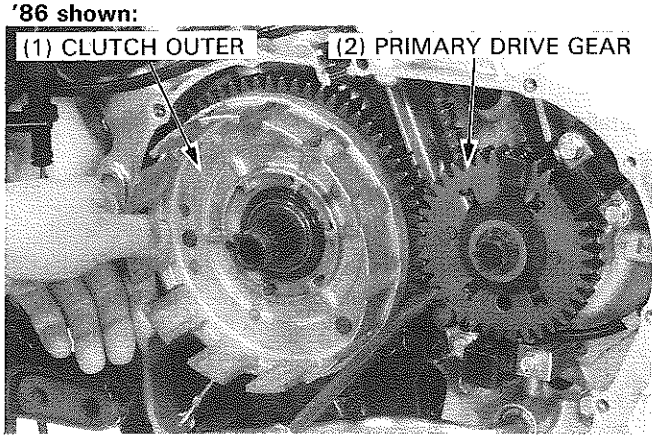
Install the needle bearing into the clutch outer.
Align the holes in the clutch outer with the pins on the oil pump drive sprocket and install the clutch outer onto the outer guide.

'86 shown:



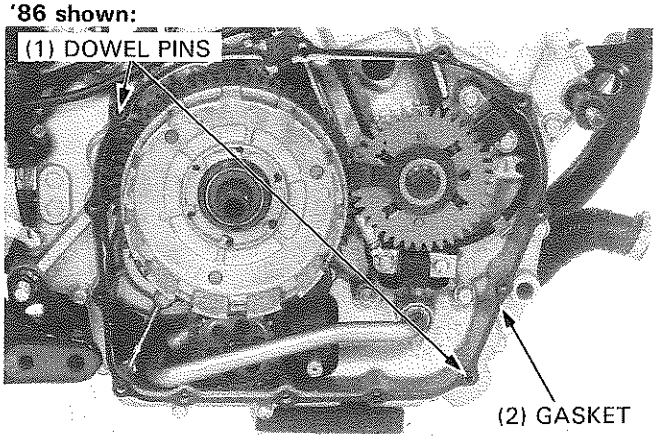
Push the clutch outer onto the mainshaft while aligning the primary drive gear and sub-gear teeth with a screwdriver. Move the oil pump driven sprocket to fit the pins on the sprocket with the holes in the clutch outer.

'86 shown:

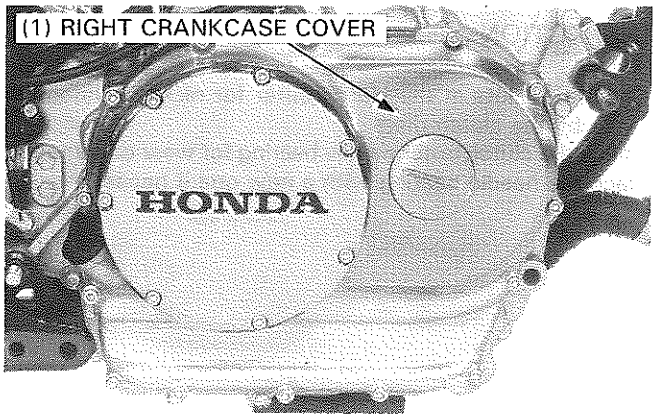


Install the clutch assembly (page 7-17).
Install a new gasket and dowel pins.

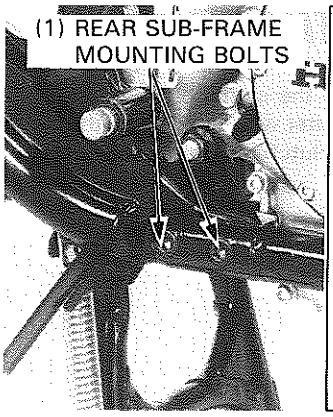
'86 shown:

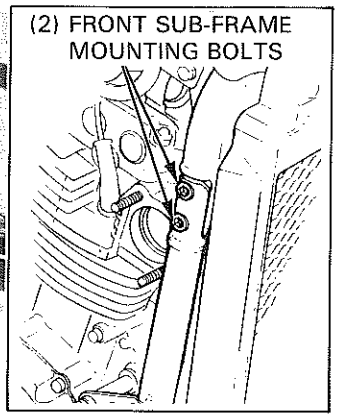


Install the right crankcase cover and tighten the bolts securely.



Install the sub-frame.
Tighten the bolts.





TORQUE:

Front engine mounting bracket bolt:
30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)
Front engine mounting nut:
45—60 N·m (4.5—6.0 kg-m, 33—43 ft-lb)
Front sub-frame mounting bolt:
60—70 N·m (6.0—7.0 kg-m, 43—51 ft-lb)
apply oil to the threads
Rear sub-frame mounting bolt:
35—45 N·m (3.5—4.5 kg-m, 25—33 ft-lb)

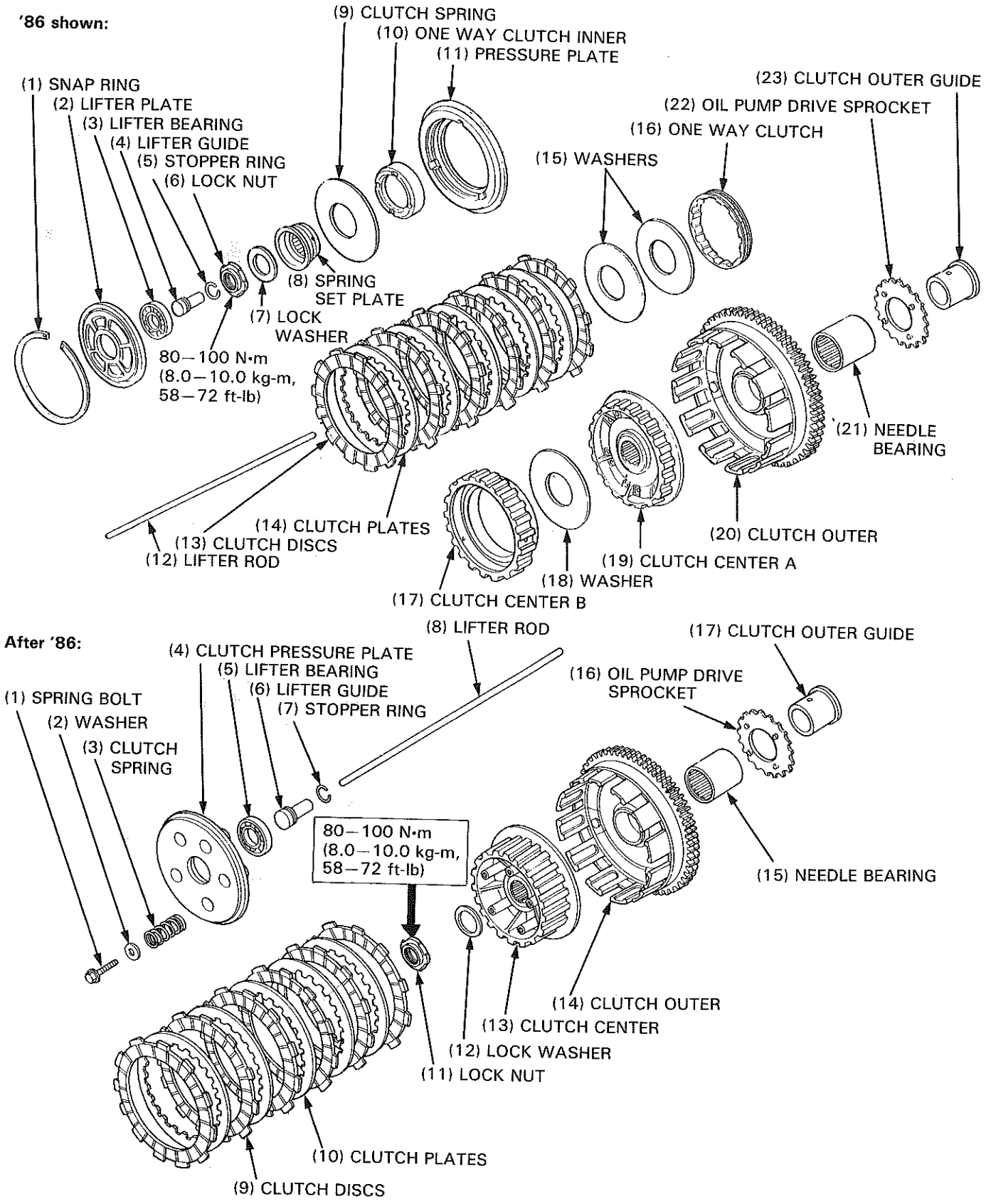
Install the radiator onto the sub-frame and install the radiator cover.

Install the right exhaust pipe and protector.

TORQUE:

Exhaust pipe joint nut:
8—14 N·m (0.8—1.4 kg-m, 6—10 ft-lb)
Muffler band bolt:
15—25 N·m (1.5—2.5 kg-m, 11—18 ft-lb)
Exhaust pipe protector bolt:
7—11 N·m (0.7—1.1 kg-m, 5—8 ft-lb)

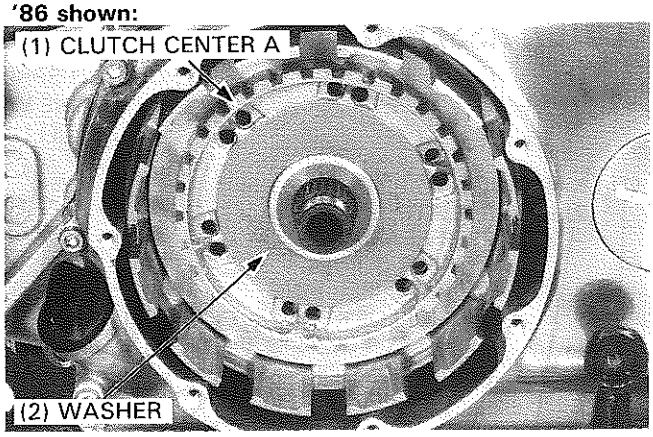
CLUTCH ASSEMBLY



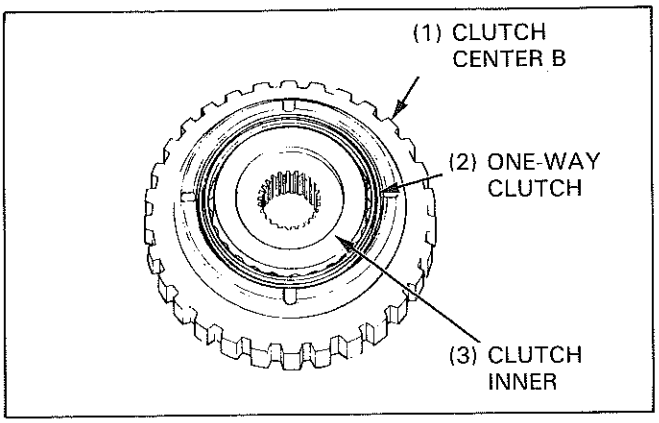
'86 only:
Install clutch center A and the washer.

After '86:
Install the clutch center and turn to page 7-20.

'86 shown:



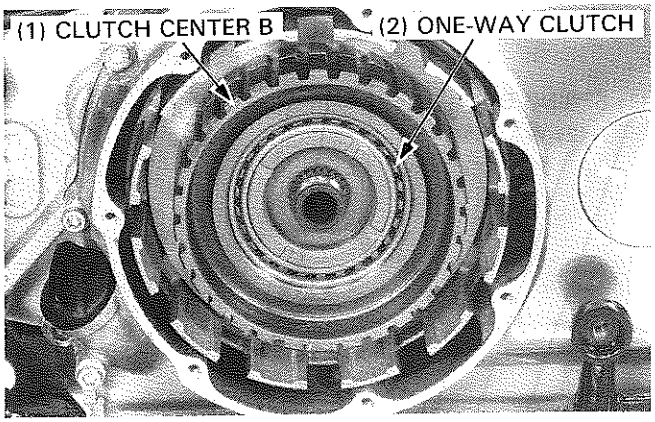
'86 only:
Install the one-way clutch into clutch center B with its flange cage facing out.
Place clutch center B with its grooved side facing up.
Install the clutch inner into the one-way clutch with its grooves facing down.
Turn it clockwise as you install the clutch inner.



Install the one-way clutch and clutch center B assembly over the mainshaft.

NOTE

- Make sure the one-way clutch assembly is installed correctly by turning clutch center B.
  Clutch center B should turn clockwise freely and should not turn counterclockwise.



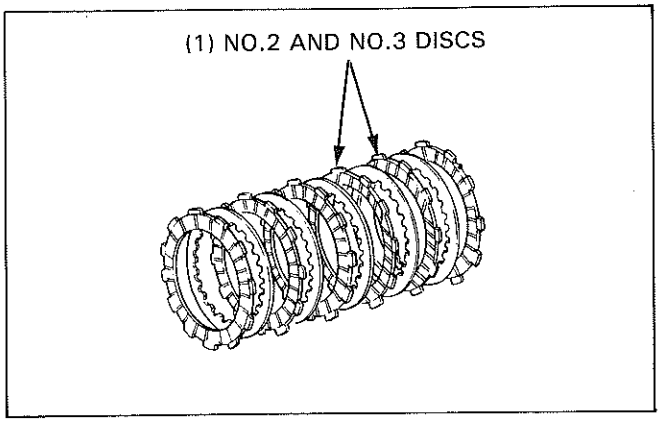
Coat the discs and plates with clean engine oil.
Install the clutch discs and plates as shown.

NOTE

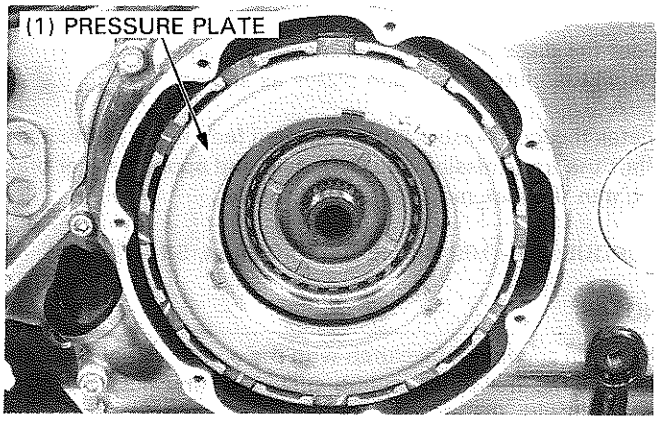
- The No.2 and No.3 clutch discs from the inside have different groove patterns than the rest.

CAUTION

- *Do not pull clutch center B out after installing the discs and plates or plates will fall between clutch centers A and B. This will cause the clutch to not disengage.*



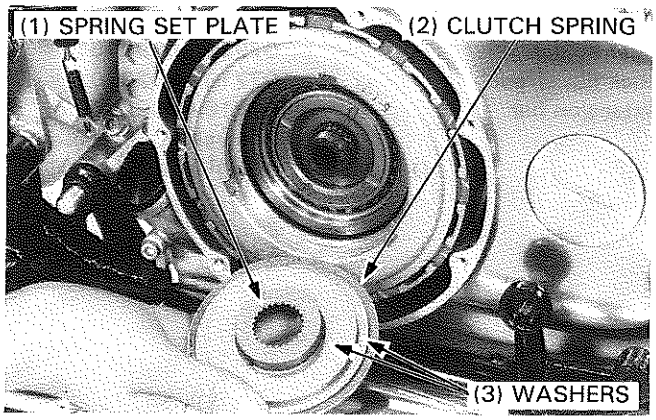
Install the clutch pressure plate.



Install the clutch spring set plate, clutch spring, and washers.

NOTE

- Install the clutch spring with the dished face towards the inside.



Install the lock washer with its dished face towards the inside.

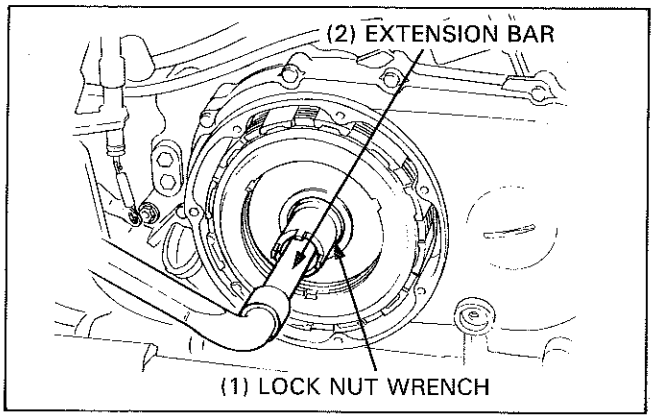
Place the transmission in O.D. gear.

Apply the rear brake and tighten the lock nut.

NOTE

- When servicing the clutch with the engine out of the frame, shift the transmission into gear and hold the output shaft with the gear holder.

TORQUE: 80—100 N·m (8.0—10.0 kg-m, 58—72 ft-lb)



TOOLS:

Gear holder	**07923—6890101**
Lock nut wrench	**07716—0020203**
Extension bar	**07716—0020500 or equivalent commercially available in U.S.A.**

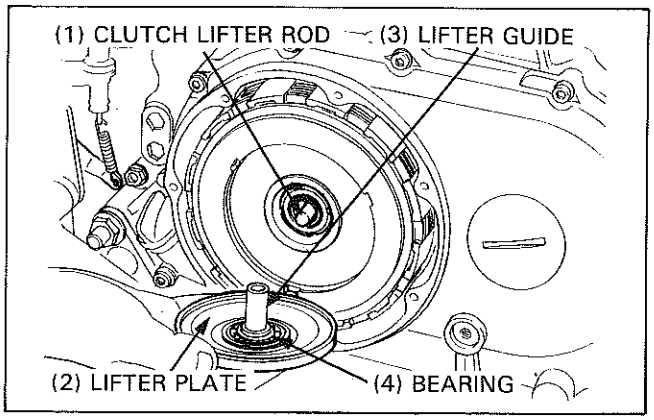
Install the clutch lifter rod.

Install the clutch lifter plate, lifter guide and bearing.

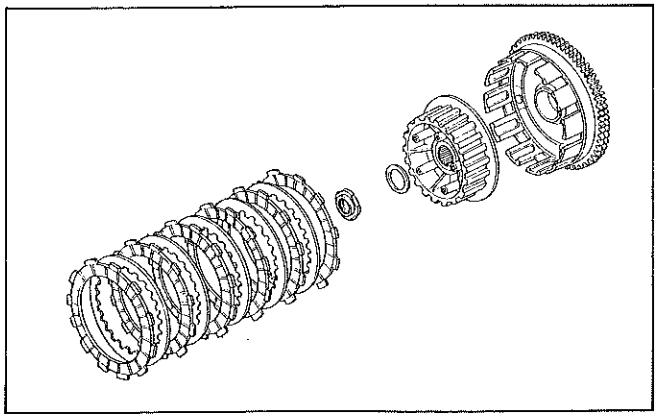
NOTE

- Apply 2—3 drops of clean engine oil into the lifter guide.

Install the snap ring.



After '86:
Coat the discs and plates with clean engine oil.
Install the clutch discs and plates as shown.



Install the lock washer with its dished face towards the inside.
Shift the transmission into O.D. gear and apply the rear brake.
Tighten the lock nut to specified torque.

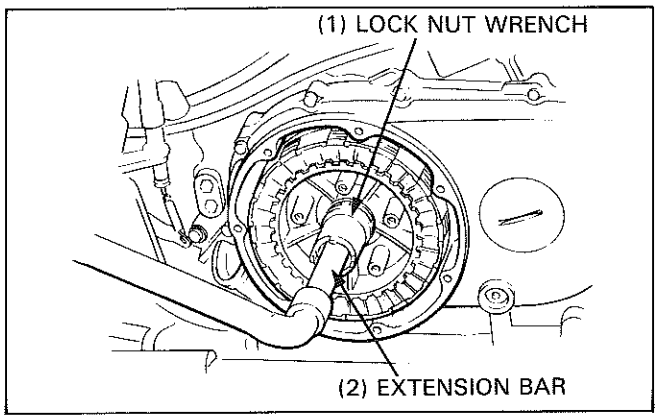
TORQUE: 80—100 N·m (8.0—10.0 kg-m, 58—72 ft-lb)

NOTE

- When servicing the clutch with the engine out of the frame, shift the transmission into O.D. gear and hold the output shaft with the gear holder.

TOOLS:

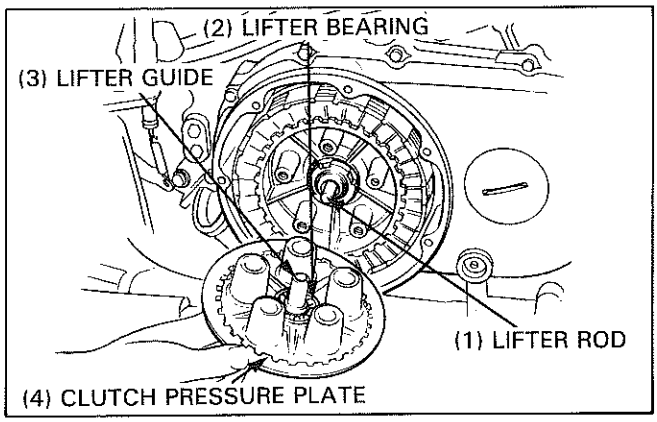
Gear holder	**07923—6890101**
Lock nut wrench	**07716—0020203**
Extension bar	**07716—0020500 or equivalent commercially available in U.S.A.**



Insert the lifter rod into the mainshaft.
Install the clutch lifter bearing and lifter guide into the clutch pressure plate.
Install the clutch pressure plate.

NOTE

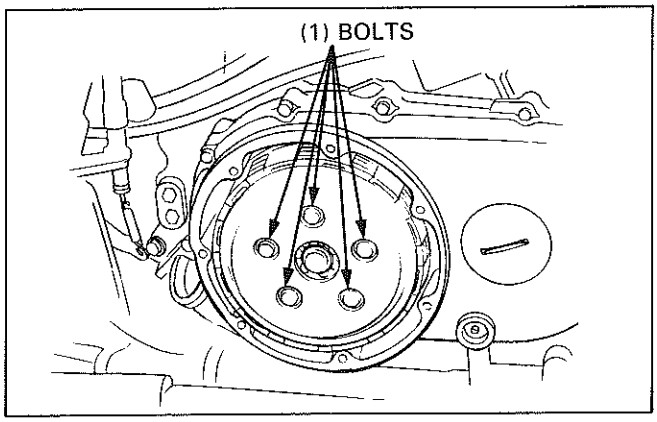
- Apply 2—3 drops of clean engine oil into the lifter guide.



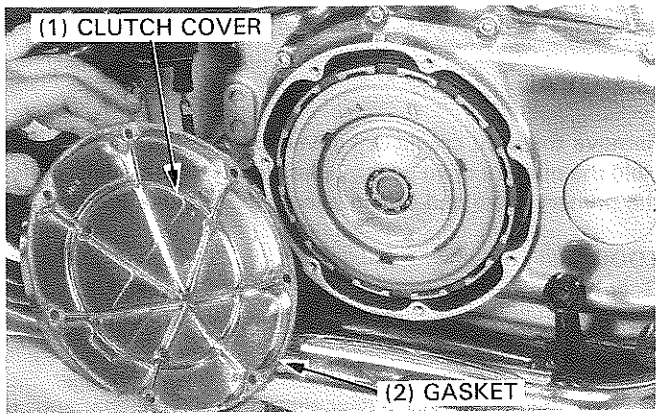
Install the clutch springs, plain washers and bolts.

NOTE

- Tighten the bolts evenly in 2—3 steps in a crisscross pattern.



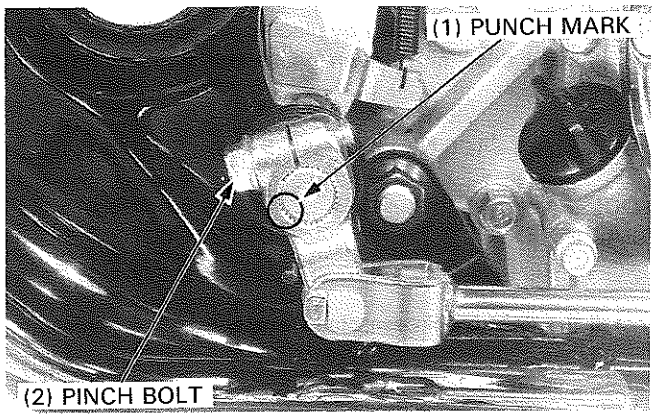
Install a new gasket onto the clutch cover.



Install the clutch cover and tighten the bolts.

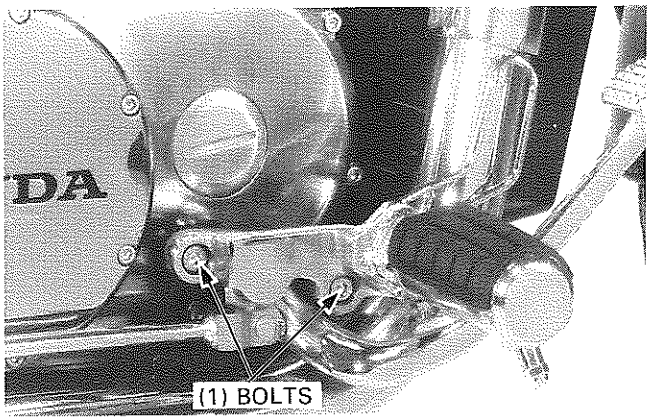
TORQUE: 8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)

Install the brake arm onto the pivot shaft aligning the punch marks on the shaft and arm.
Tighten the arm pinch bolt.



Install the foot peg and tighten the bolts.

TORQUE: 24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)



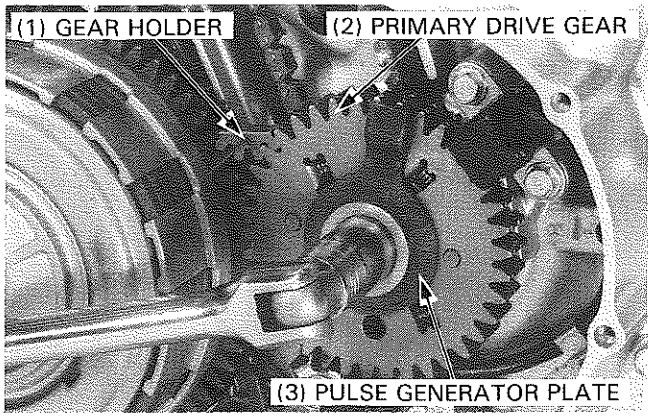
PRIMARY DRIVE GEAR

REMOVAL

Remove the right crankcase cover (page 7-14).
Hold the primary drive gear by placing the gear holder between the primary drive and driven gears, and remove the bolt.

TOOL:
Gear holder **07724—0010100**
Not available in U.S.A.

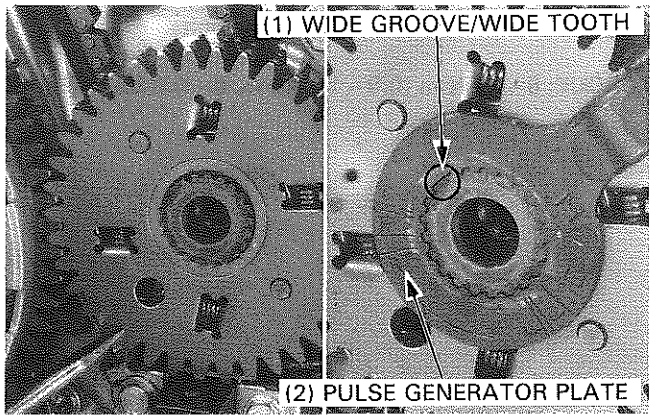
Remove the pulse generator plate.
Remove the primary drive gear aligning the drive gear and sub-gear teeth with a screwdriver.



INSTALLATION

Install the primary drive gear onto the crankshaft aligning the primary drive gear and sub-gear teeth with a screwdriver.

Align the wide groove in the pulse generator plate with the wide tooth on the crankshaft and install the pulse generator plate.

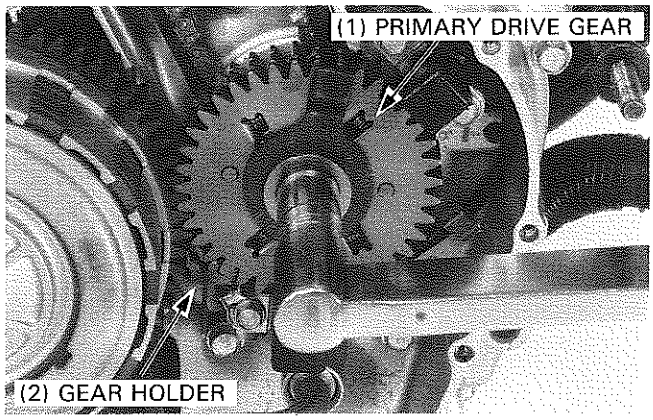


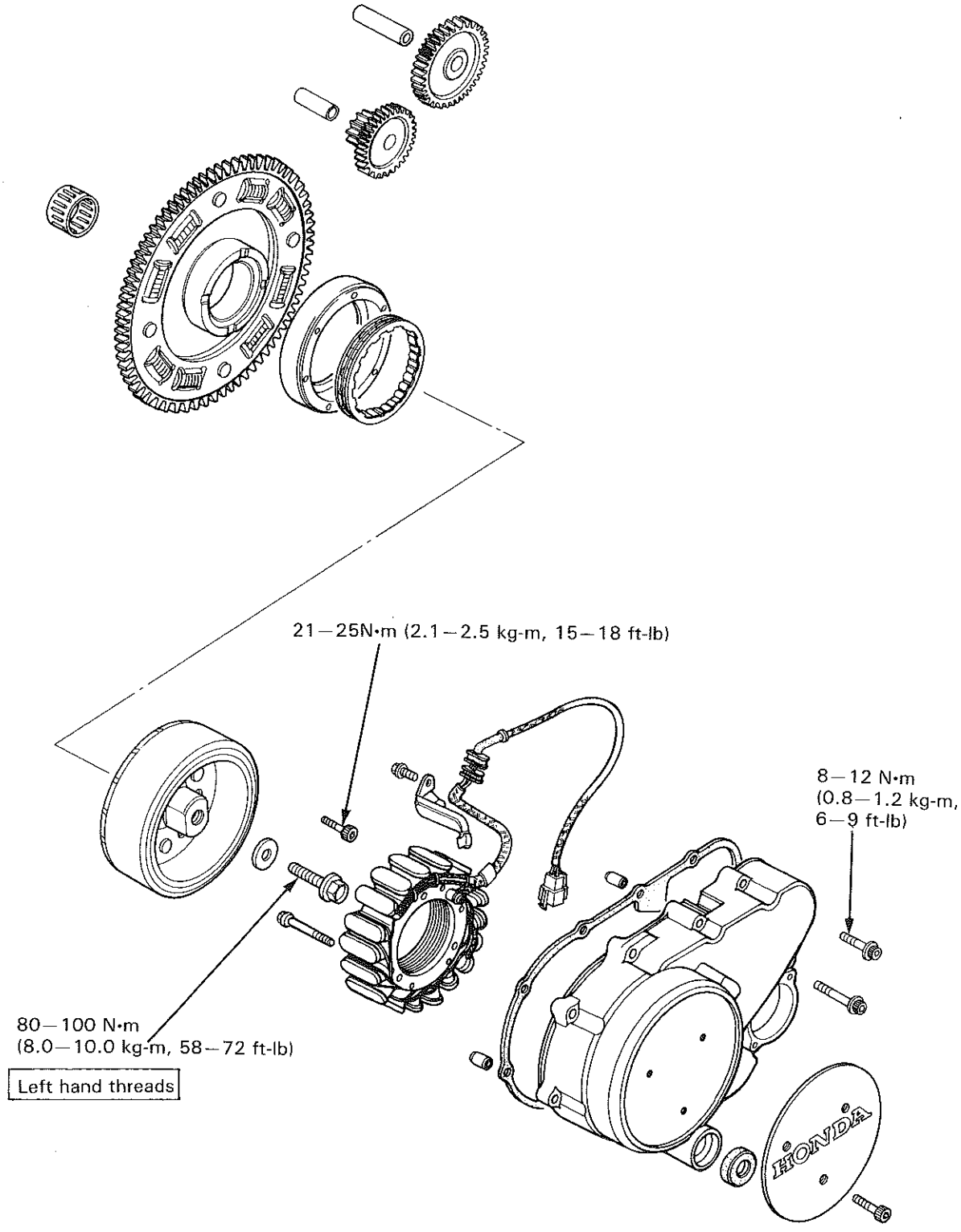
Hold the primary drive gear by placing the gear holder between the primary drive and driven gears and tighten the primary drive gear bolt.

TORQUE: 95—105 N·m (9.5—10.5 kg-m, 69—76 ft-lb)

TOOL:
GEAR HOLDER **07724—0010100**
Not available in U.S.A.

Install the right crankcase cover (page 7-15).




21—25N·m (2.1—2.5 kg-m, 15—18 ft-lb)
8—12 N·m
(0.8—1.2 kg-m,
6—9 ft-lb)
80—100 N·m
(8.0—10.0 kg-m, 58—72 ft-lb)
Left hand threads
HONDA

8. ALTERNATOR/STARTER CLUTCH

SERVICE INFORMATION

GENERAL

- This section covers removal and installation of the alternator and starter clutch.
- Refer to section 18 for troubleshooting and inspection of the alternator.

SPECIFICATIONS

	STANDARD	SERVICE LIMIT
Starter driven gear O.D.	57.710—57.840 mm (2.2720—2.2772 in)	57.60 mm (2.268 in)
Starter clutch outer I.D.	74.414—74.440 mm (2.9297—2.9307 in)	74.50 mm (2.933 in)

TORQUE VALUE

Alternator rotor/Flywheel bolt	80—100N·m (8.0—10.0 kg-m, 58—72ft-lb) Left hand threads, Apply oil to the threads
Starter one way clutch bolt	21—25 N·m (2.1—2.5 kg-m, 15—18 ft-lb) Apply a locking agent
Alternator cover bolts	8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
Gearshift pedal bolt	18—25 N·m (1.8—2.5 kg-m, 13—18 ft-lb)

TOOLS

Special

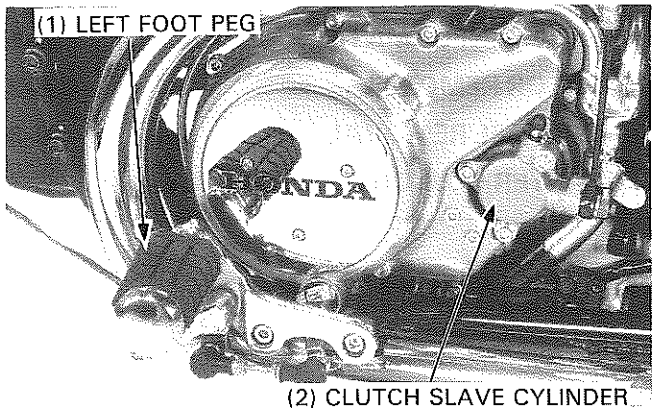
Flywheel holder	07925—ME90000—or band strap wrench (commercially available in U.S.A.)

Common

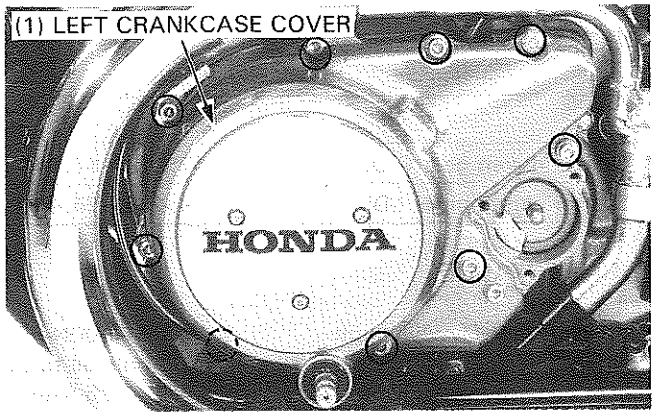
Rotor puller	07733—0020001 or 07933—3950000

STATOR REMOVAL

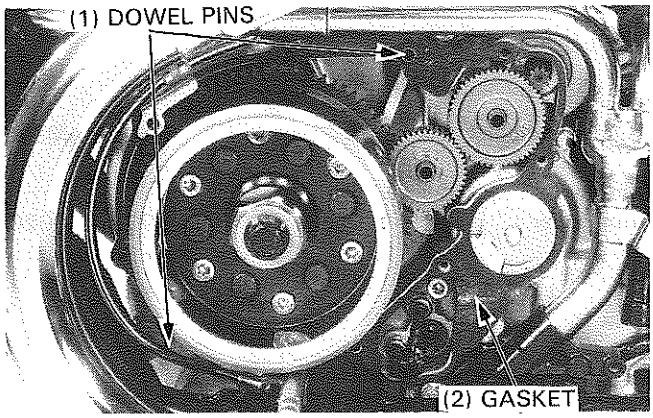
Remove the seat and left side cover.
Disconnect the stator coupler and remove the wire band.
Remove the clutch slave cylinder (page 7-8).
Remove the left foot peg and gear shift pedal.



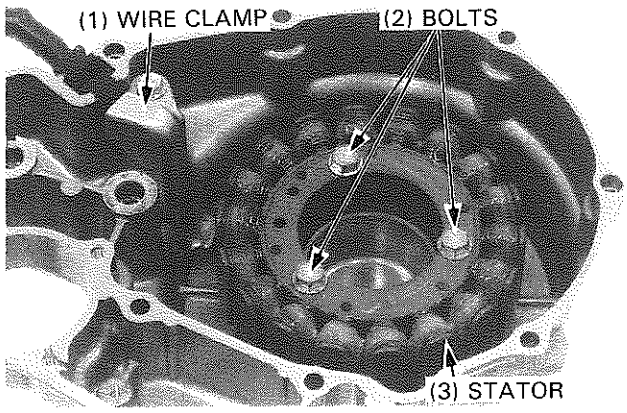
Remove the left crankcase cover bolts and cover.



Remove the gasket and dowel pins.



Remove the alternator wire clamp bolt and clamp.
Remove the three stator mounting bolts and stator from the left crankcase cover.



FLYWHEEL REMOVAL

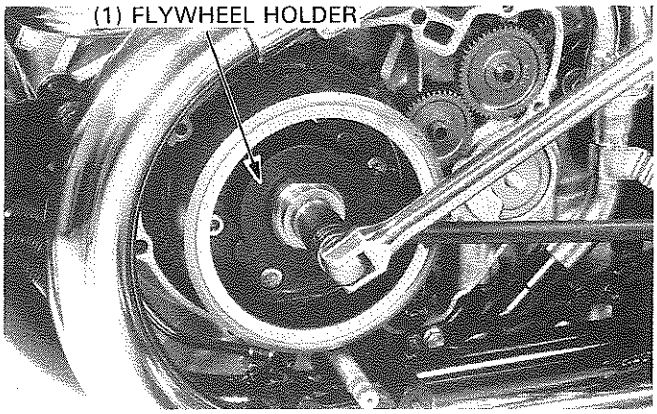
Hold the flywheel with the flywheel holder and remove the flywheel bolt.

NOTE

- The flywheel bolt has left hand threads.

TOOL:

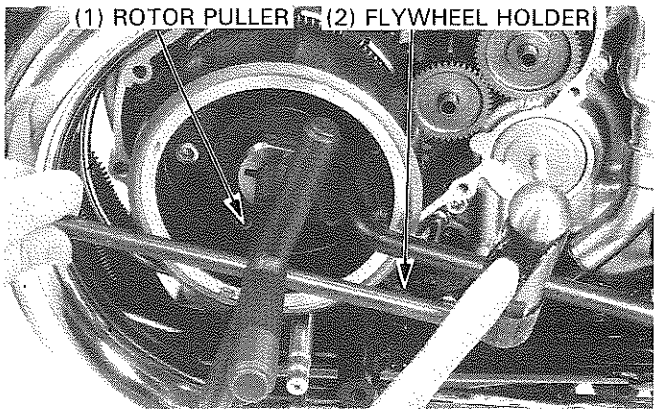
Flywheel holder	**07923–ME90000 or Band strap wrench (Commercially available in U.S.A.)**



Remove the flywheel with the rotor puller.

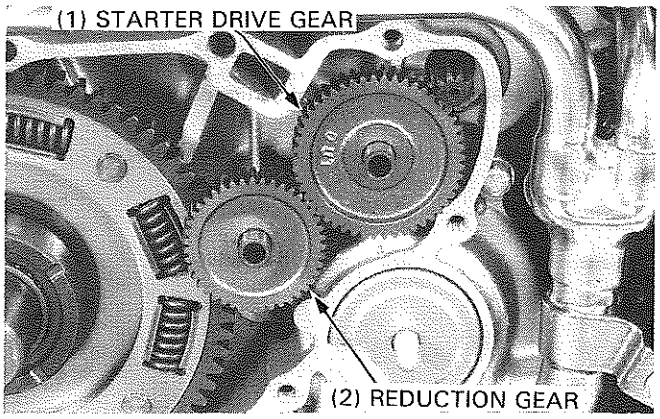
TOOL:

Rotor puller	**07733–0020001 or 07933–3950000**



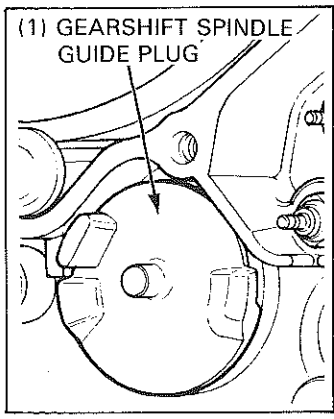
STARTER CLUTCH DISASSEMBLY

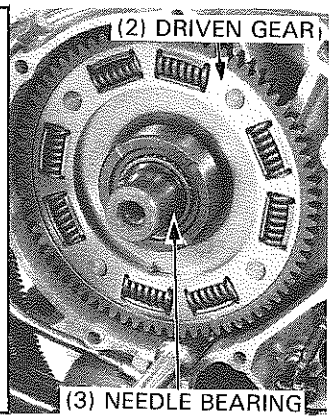
Remove the starter drive and reduction gears, and gear shafts.



Remove the gearshift spindle guide plug.
Pull the starter driven gear toward you until it stops.
Then remove the needle bearing from the gear.

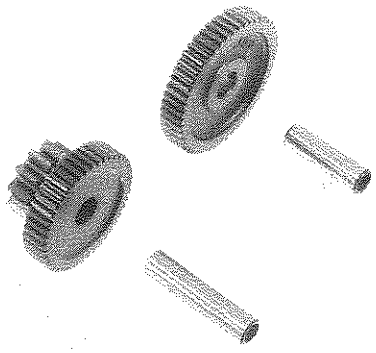
Remove the driven gear.



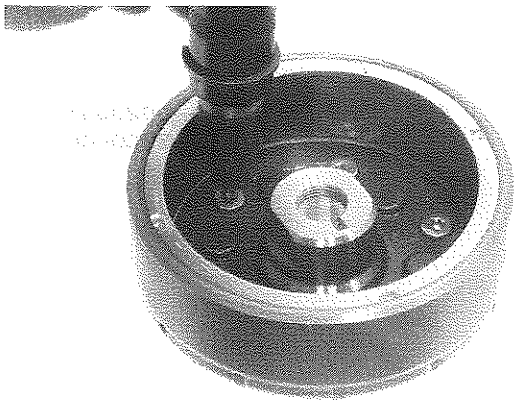


STARTER DRIVE AND REDUCTION GEAR INSPECTION

Check the I.D. and teeth for excessive or abnormal wear, or evidence of insufficient lubrication.



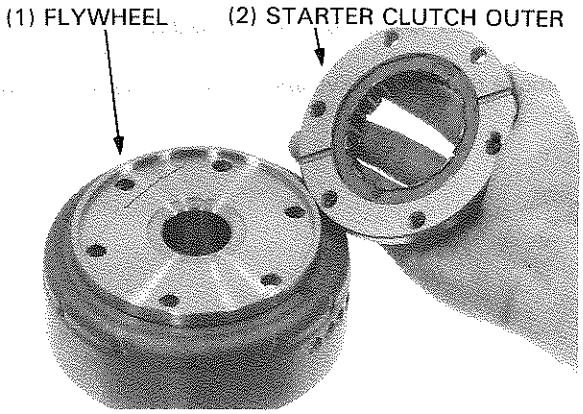
Remove the six T-40 torx bolts attaching the starter clutch to the flywheel and remove the starter clutch and clutch outer.



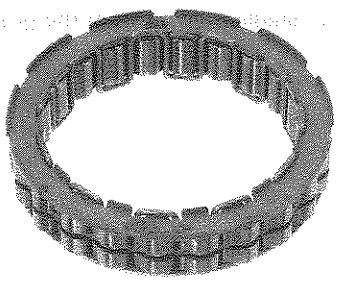
STARTER CLUTCH INSPECTION

Inspect the starter clutch for smooth operation.

Remove the starter clutch from the clutch outer.

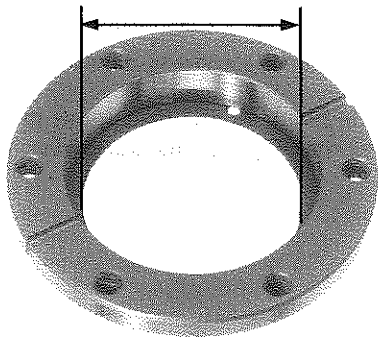


Check the starter clutch rollers for excessive wear.



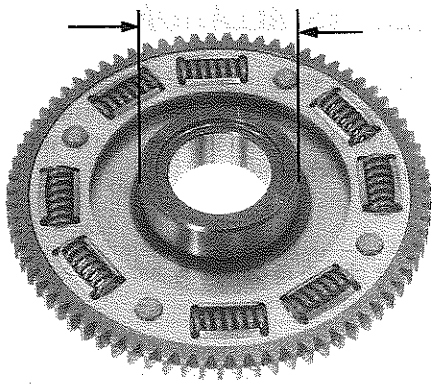
Inspect the starter clutch outer for damage or excessive wear.
Measure the starter clutch outer I.D.

SERVICE LIMIT:74.50 mm (2.933 in)



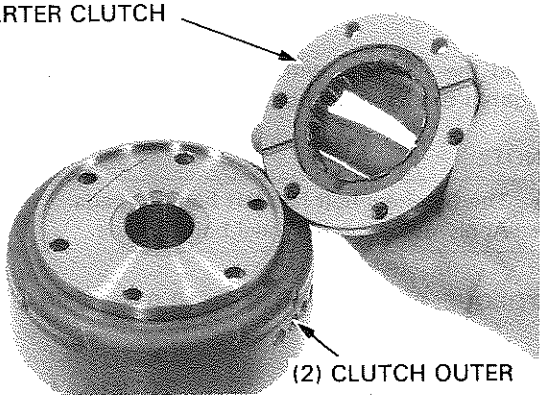
Inspect the starter driven gear for damage or excessive wear.
Measure the starter driven gear hub O.D.

SERVICE LIMIT:57.60 mm (2.268 in)



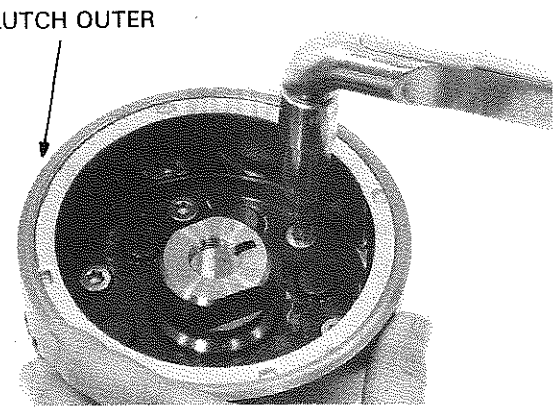
STARTER CLUTCH ASSEMBLY

Install the starter clutch into the clutch outer.



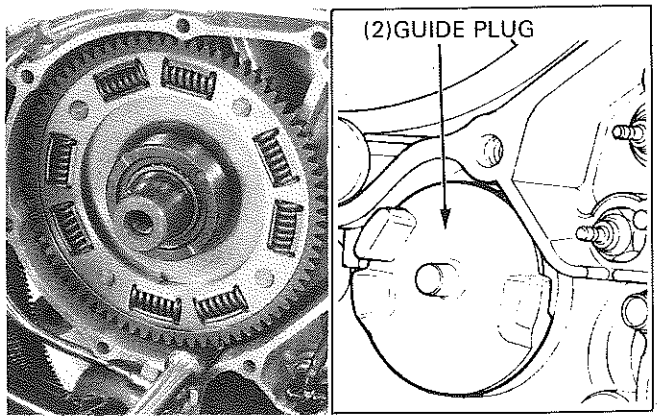
Apply locktite, 3-Bond or equivalent to all torx bolt threads, and install and tighten the six T-40 torx bolts.

TORQUE:21—25 N·m (2.1—2.5 kg-m, 15—18 ft-lb)



Install the starter driven gear and needle bearing over the crankshaft.
Make sure the gear shift spindle teeth are correctly aligned.

Coat a new O-ring with oil and place it on the spindle guide plug, then install the plug into the crankcase.



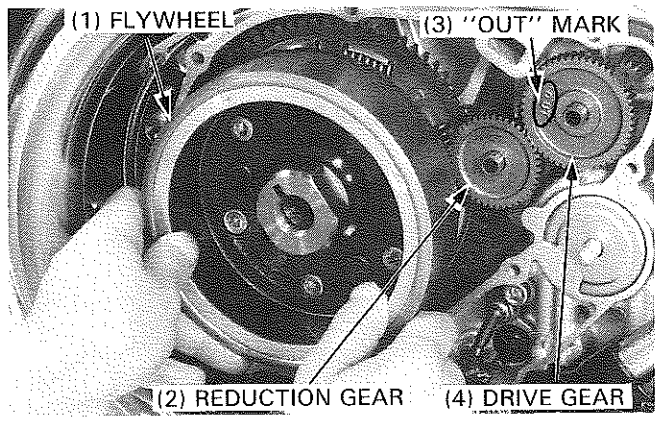
FLYWHEEL INSTALLATION

Install the flywheel on the crankshaft aligning the woodruff key on the crankshaft with the key way in the flywheel, then install it over the starter clutch inner of the driven gear while turning the gear clockwise.

NOTE

- If the starter clutch is correctly assembled, the driven gear will only turn clockwise.

Install the starter reduction gear and shaft.
Install the starter drive gear and shaft with the OUT mark on the gear facing out.



Hold the flywheel with the flywheel holder and install and tighten the flywheel bolt.

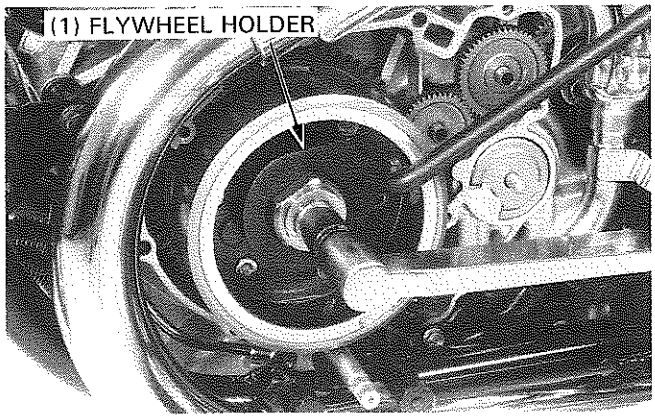
NOTE

- The flywheel bolt has left hand threads.
- Apply oil to the flywheel bolt threads.

TORQUE: 80—110 N·m (8.0—10.0 kg-m, 58—72 ft-lb)

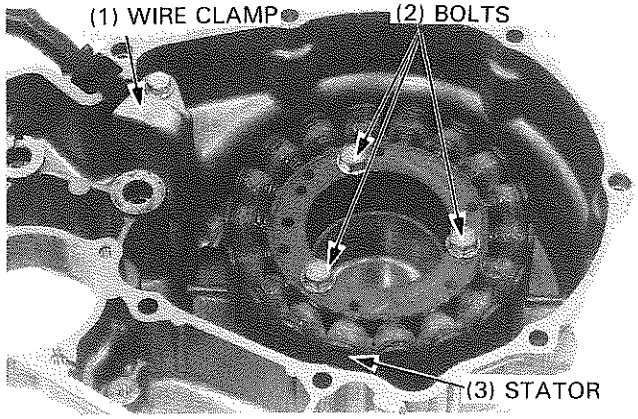
TOOL:

Flywheel holder	**07925—ME90000 or band strap wrench (Commercially available in U.S.A.)**

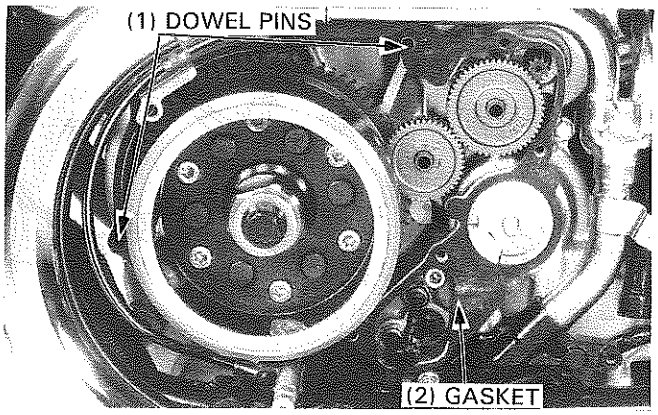


STATOR INSTALLATION

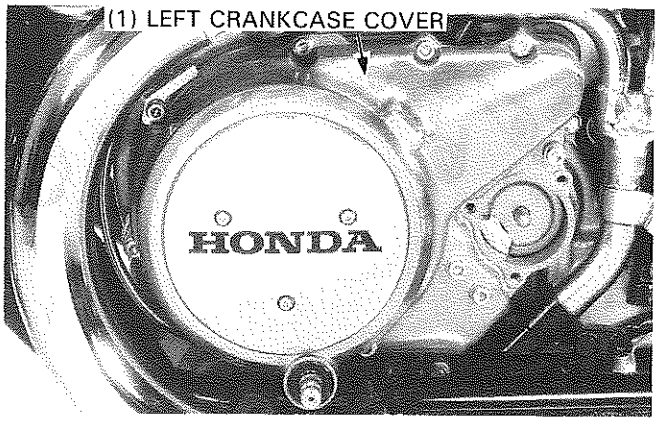
Install the stator on the left crankcase cover and tighten the bolts securely.
Install the alternator wire clamp.



Install the dowel pins and a new gasket.



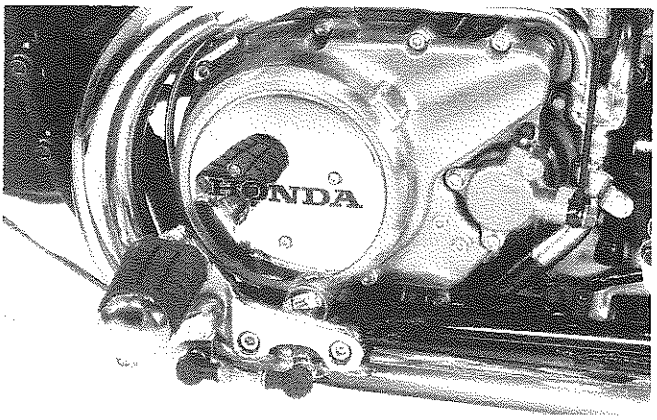
Install the left crankcase cover.

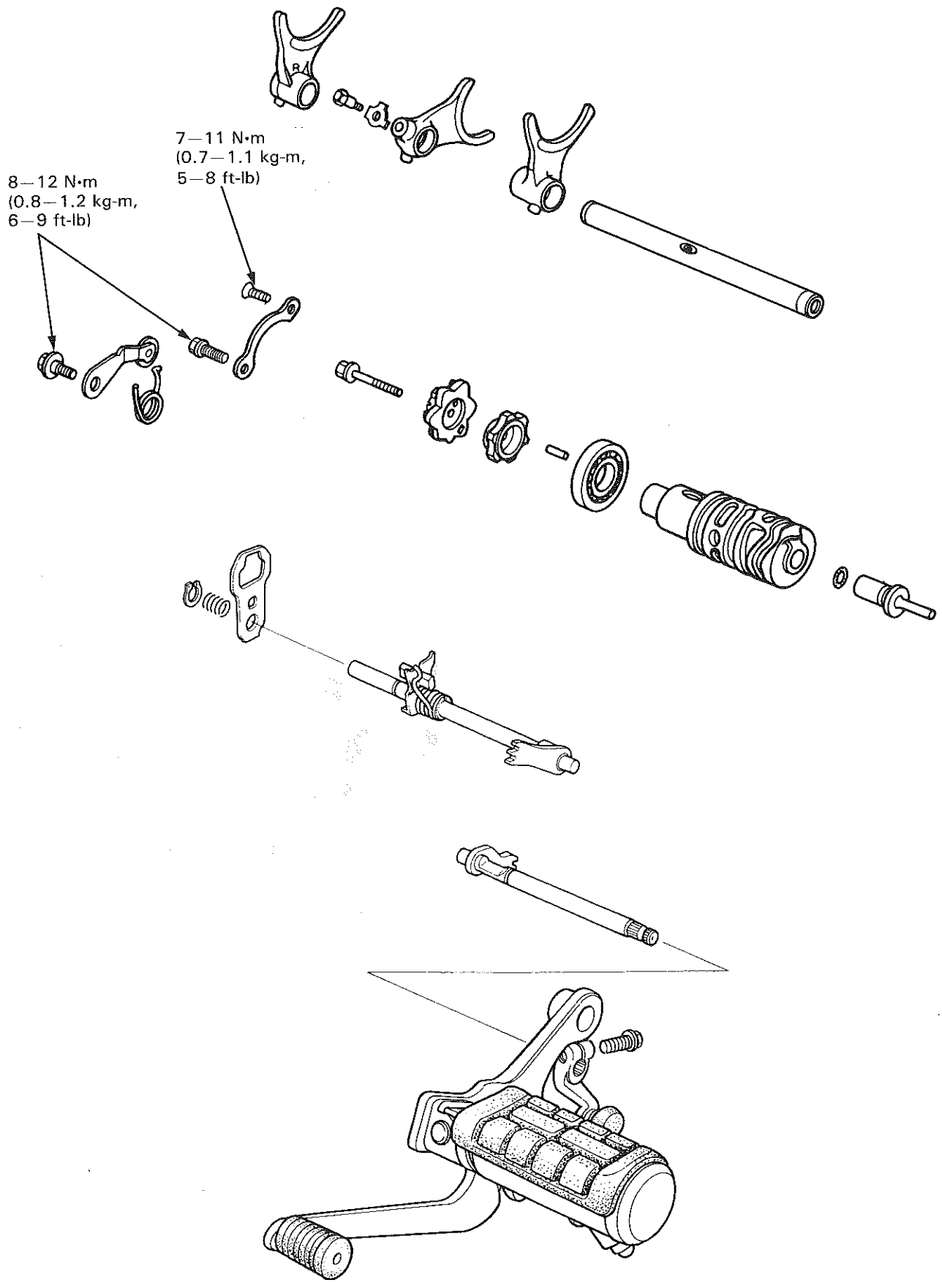


Install the left foot peg and gear shift lever.
Align the punch mark on the shift spindle one tooth clockwise from the slit in the shift arm.
Tighten the gearshift pedal bolt.

TORQUE: 18—25 N·m (1.8—2.5 kg-m, 13—18 ft-lb)

Install the clutch slave cylinder (page 7-9).
Connect the alternator wire.




7—11 N·m
(0.7—1.1 kg-m,
5—8 ft-lb)
8—12 N·m
(0.8—1.2 kg-m,
6—9 ft-lb)

9. GEARSHIFT LINKAGE

SERVICE INFORMATION

GENERAL

- The gearshift spindle and stopper arms can be serviced with the engine in the frame.
- If the shift forks, drum and transmission require servicing, remove the engine and separate the crankcase (section 12).
- When installing the shift lever; align the punch mark on the spindle one tooth clockwise from the slit in the lever.

SPECIFICATION

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Mainshaft O.D.	24.980—24.993 (0.9835—0.9840)	24.93 (0.981)
Clutch outer guide I.D.	24.955—25.012 (0.9825—0.9847)	25.08 (0.987)

TORQUE VALUES

Shift drum bearing set plate	screw	7—11 N·m (0.7—1.1 kg-m, 5—8 ft-lb) Apply a locking agent
	bolt	8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb) Apply a locking agent
Stopper arm bolt		8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
Oil pump driven sprocket bolt		15—20 N·m (1.5—2.0 kg-m, 11—14 ft-lb)

TROUBLESHOOTING

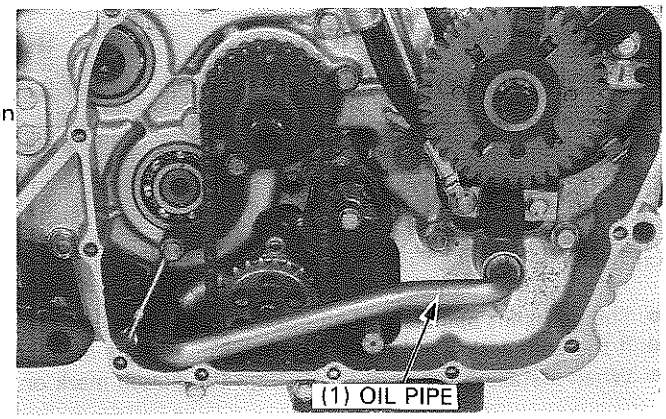
Hard to shift
- Air in the clutch lifter hydraulic system
- Shift forks bent
- Shift claw bent
- Shift drum cam grooves damaged
- Leak in the clutch lifter hydraulic system

Transmission jumps out of gear
- Gear dogs worn
- Shift shaft bent
- Shift drum stopper broken
- Shift forks bent

GEARSHIFT LINKAGE REMOVAL

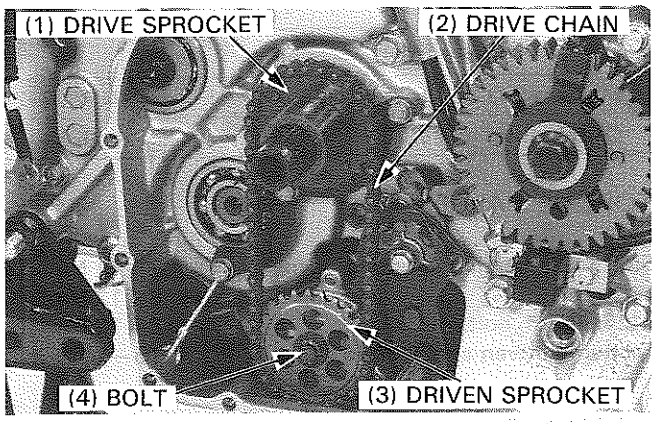
Remove the right crankcase cover and clutch assembly (section

Remove the oil pipe.

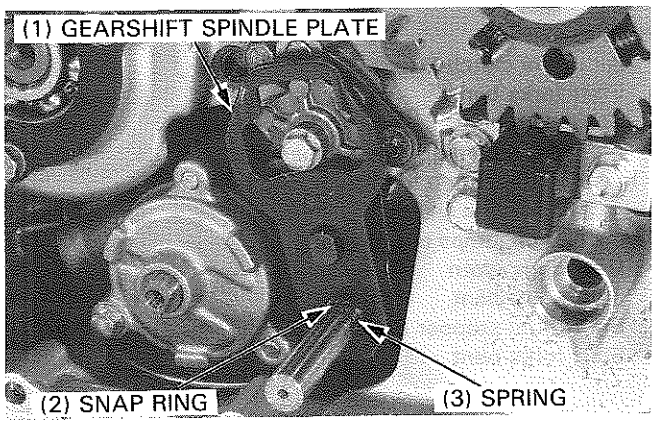


Remove the oil pump driven sprocket bolt.

Remove the oil pump drive chain, drive and driven sprockets as a set.

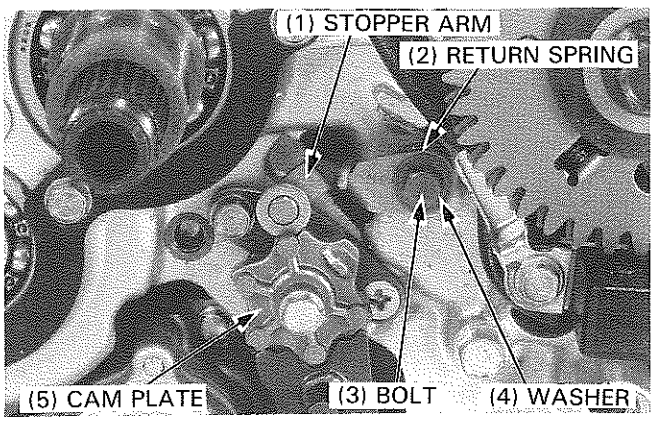


Remove the snap ring, spring and gearshift spindle plate.

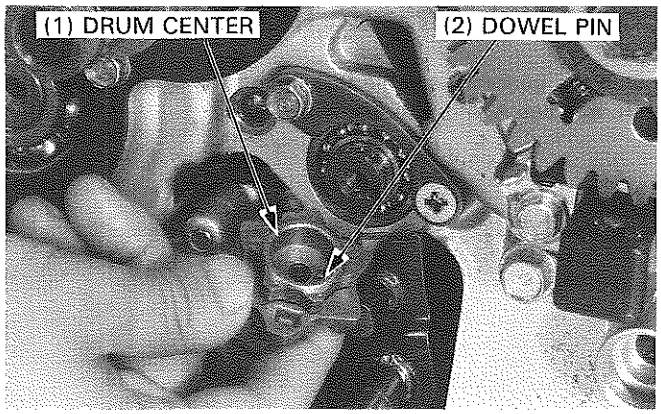


Remove the stopper arm bolt, arm, washer and return spring.

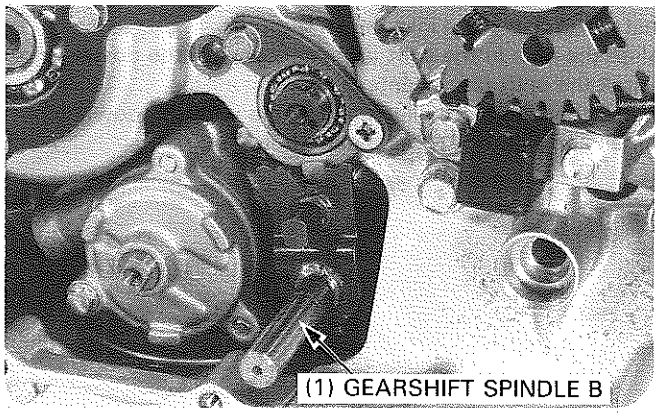
Remove the cam plate bolt and cam plate.



Remove the shift drum center and dowel pin.



Remove the gearshift spindle B.

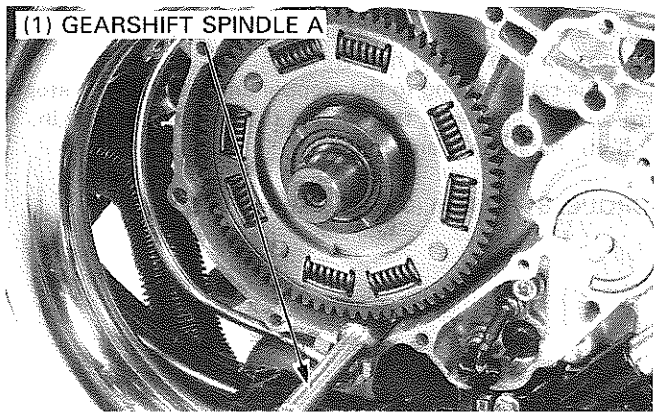


To remove the gearshift spindle A, remove the following:
— left crankcase cover (page 8-2)
— flywheel (page 8-4)
— shift spindle guide plug.

Remove the gearshift spindle with the starter driven gear.

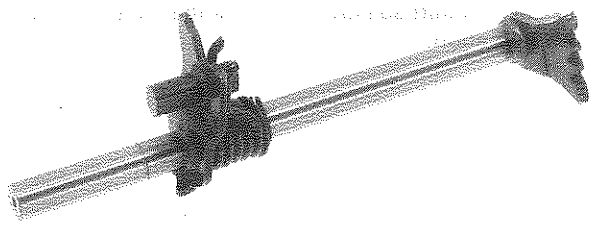
NOTE

- When installing the gearshift spindle guide plug, use a new O-ring and coat it with oil.



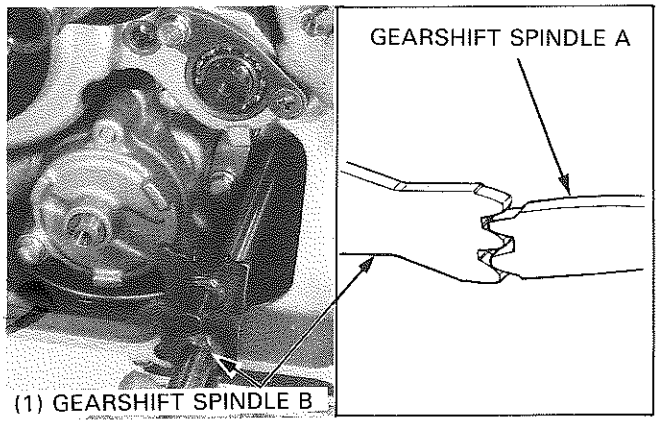
INSPECTION

Check the gearshift spindle for wear or damage.
Replace if necessary.

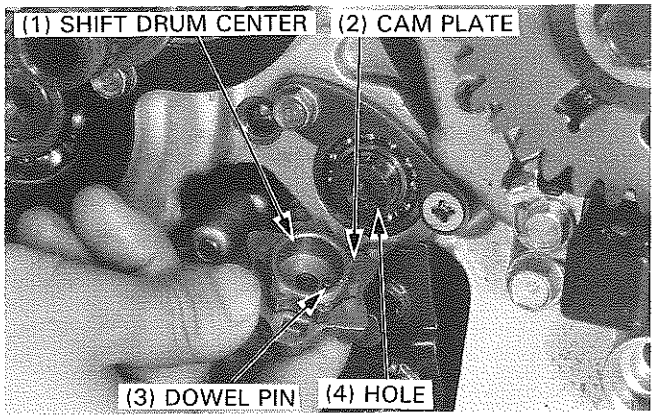


GEARSHIFT LINKAGE INSTALLATION

Install the gearshift spindle B, aligning the teeth of the gearshift spindles A and B as shown.

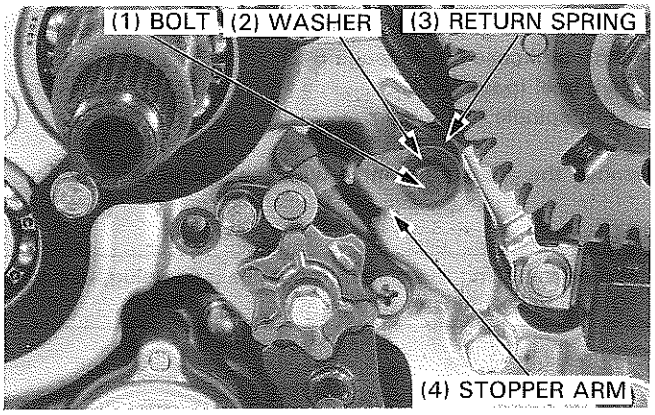


Install the dowel pin into the shift drum.
Align the hole in the shift drum center with the dowel pin and install the shift drum center.
Install the cam plate aligning the hole with the dowel pin.
Install and tighten the cam plate bolt.



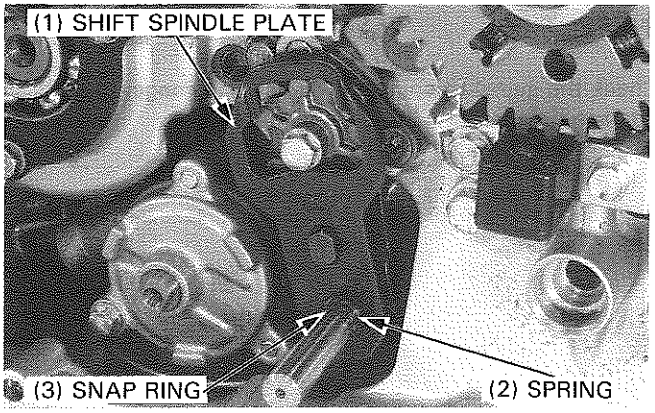
Install the return spring, washer and stopper arm, and screw the stopper arm bolt in half way.
Hook the return spring to the stopper arm and rest the stopper arm on the cam plate, then screw the bolt all the way in.
Tighten the stopper arm bolt.

TORQUE: 8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)



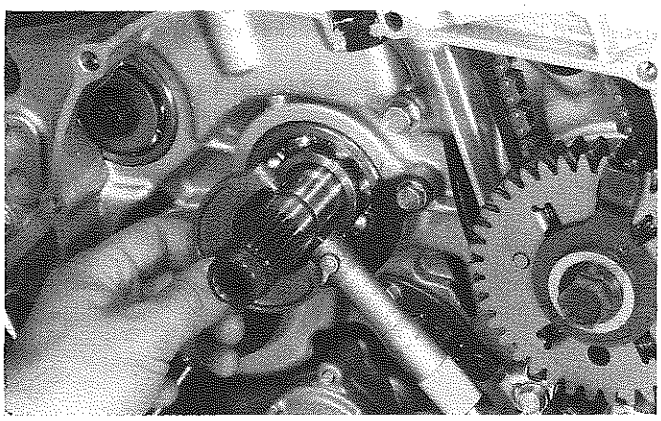
Install the shift spindle plate, spring and snap ring over shift spindle B.

Rotate the gearshift spindle and check the shift mechanism for smooth operation.



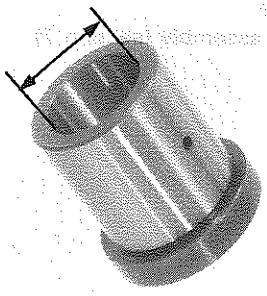
Measure the mainshaft outside diameter.

SERVICE LIMIT: 24.93 mm (0.981 in)

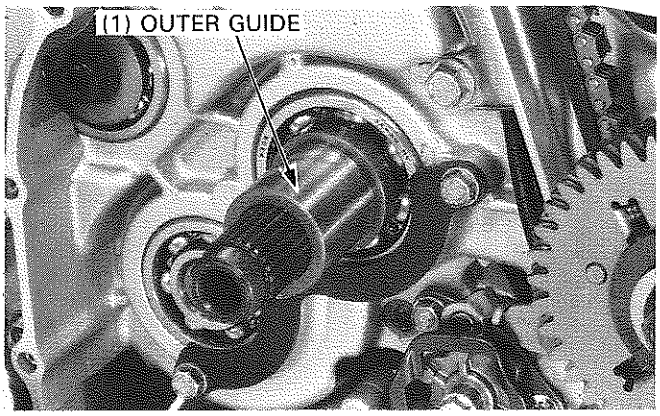


Measure the clutch outer guide inside diameter.

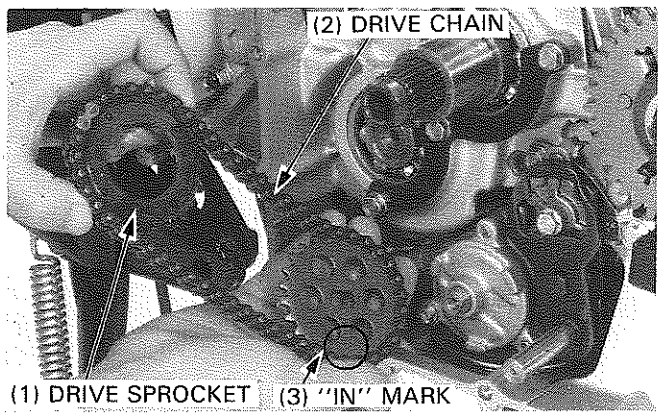
SERVICE LIMIT: 25.08 mm (0.987 in)



Install the clutch outer guide over the mainshaft.

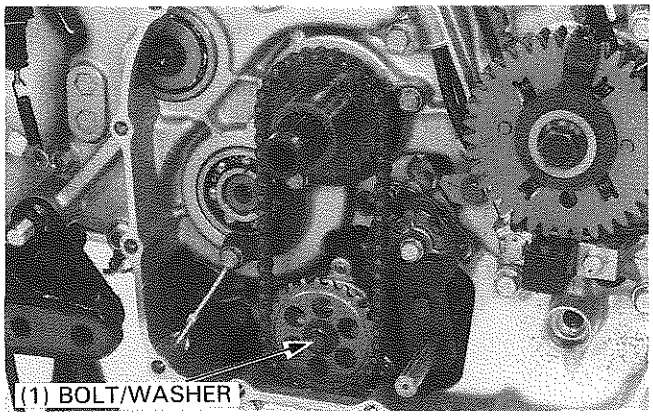


Install the oil pump drive chain, drive and driven sprockets with the dowel pin side of the drive sprocket facing out and with the "IN" mark on the driven sprocket facing in.

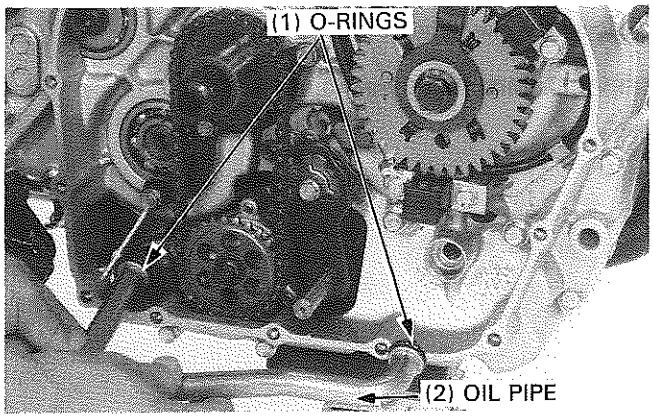


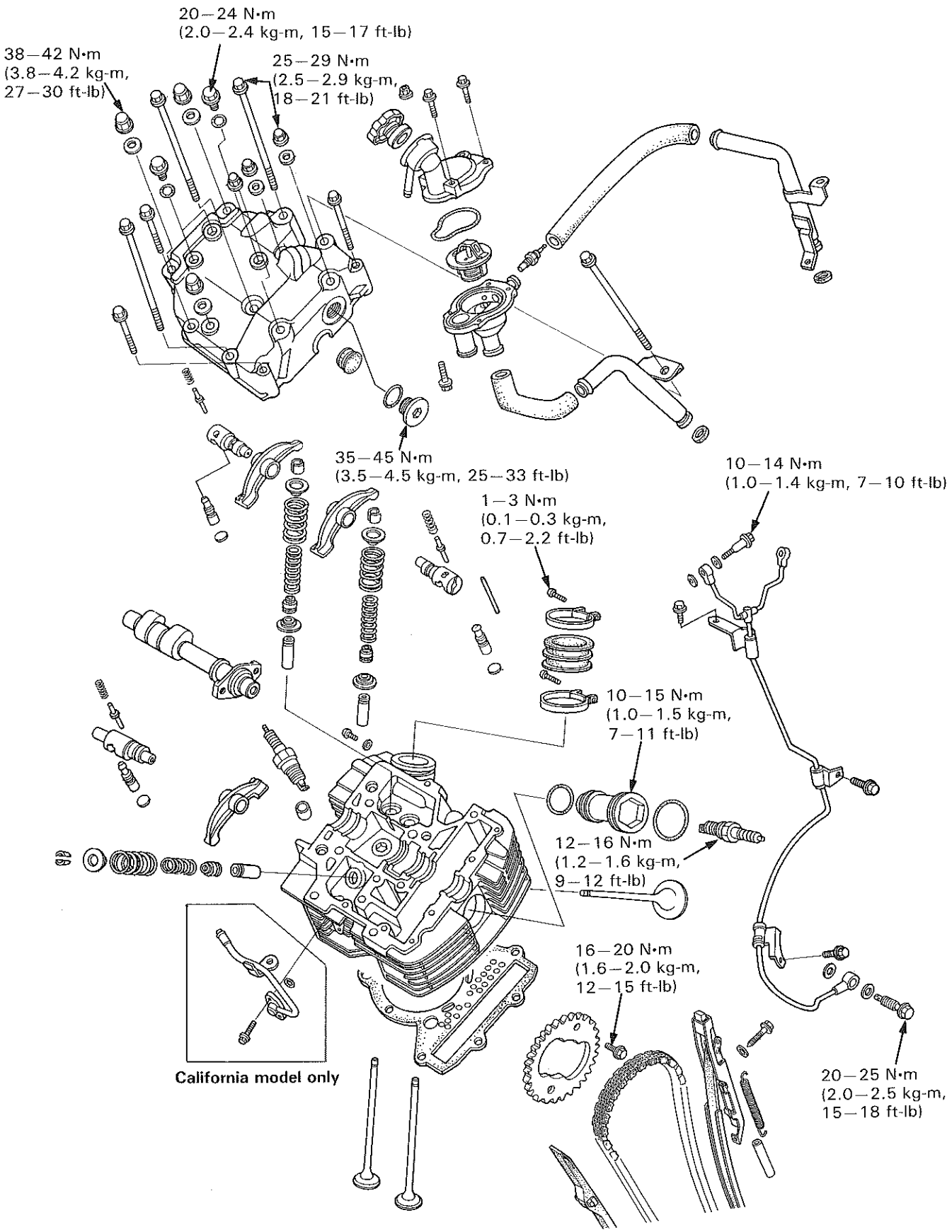
Install and tighten the driven sprocket with the washer.

TORQUE: 15—20 N·m (1.5—2.0 kg-m, 11—14 ft-ib)



Install new O-rings on the ends of the oil pipe.
Install the oil pipe.
Install the clutch assembly (section 7).




20—24 N·m
(2.0—2.4 kg-m, 15—17 ft-lb)
38—42 N·m
(3.8—4.2 kg-m,
27—30 ft-lb)
25—29 N·m
(2.5—2.9 kg-m,
18—21 ft-lb)
35—45 N·m
(3.5—4.5 kg-m, 25—33 ft-lb)
1—3 N·m
(0.1—0.3 kg-m,
0.7—2.2 ft-lb)
10—14 N·m
(1.0—1.4 kg-m, 7—10 ft-lb)
10—15 N·m
(1.0—1.5 kg-m,
7—11 ft-lb)
12—16 N·m
(1.2—1.6 kg-m,
9—12 ft-lb)
16—20 N·m
(1.6—2.0 kg-m,
12—15 ft-lb)
20—25 N·m
(2.0—2.5 kg-m,
15—18 ft-lb)
California model only

10. CYLINDER HEAD/VALVE

SERVICE INFORMATION

GENERAL

- To service the cylinder heads, the engine must be removed from the frame. See Section 5 for removal and installation of the engine.
- Camshaft lubricating oil is fed through an oil line. Be sure the hole in the oil line is not clogged.
- During assembly, apply molybdenum disulfide grease to the camshaft holders and rocker arm shafts to provide initial lubrication.
- The hydraulic tappets must be adjusted with shims whenever the following parts are replaced:
  - Cylinder head cover.
  - Cylinder head.
  - Valve, valve guide and valve seat refacing.
  - Camshaft
  - Rocker arm and rocker arm shaft.

10

SPECIFICATIONS

Unit: mm (in)

ITEM				STANDARD	SERVICE LIMIT
Camshaft	Cam lobe hight			35.843 (1.4111)	35.82 (1.410)
	Runout			0.03 (0.001)	0.05 (0.002)
	Oil clearance			0.050—0.111 (0.0020—0.0044)	0.130 (0.0051)
Rocker arm	Rocker arm I.D.			13.750—13.768 (0.5413—0.5420)	13.778 (0.5424)
	Rocker arm shaft O.D.	IN		13.716—13.734 (0.5400—0.5407)	13.706 (0.5396)
		EX		13.716—13.737 (0.5400—0.5408)	13.706 (0.5396)
	Camshaft holder I.D.			20.000—20.021 (0.7874—0.7882)	20.07 (0.7902)
	Tappet assist spring free length			18.57 (0.731)	17.80 (0.701)
	Tappet compression stroke with kerosene			—	0.20 (0.008)
Valves and valve guides	Valve stem O.D.	IN		6.570—6.595 (0.2587—0.2596)	6.56 (0.258)
		EX		6.550—6.575 (0.2579—0.2589)	6.54 (0.257)
	Valve guide I.D.			6.600—6.615 (0.2598—0.2604)	6.655 (0.2620)
	Stem-to-guide clearance	IN		0.005—0.045 (0.0002—0.0018)	0.075 (0.0030)
		EX		0.025—0.065 (0.0010—0.0026)	0.115 (0.0045)
	Valve seat width			0.90—1.10 (0.035—0.043)	1.50 (0.059)
Valve springs	Free length	OUTER	IN	45.70 (1.799)	43.90 (1.728)
			EX	43.50 (1.713)	41.80 (1.646)
		INNER	IN	37.90 (1.492)	36.40 (1.433)
			EX	37.90 (1.492)	36.40 (1.433)
Cylinder head warpage				—	0.10 (0.004)

TORQUE VALUES

Cylinder head cover 10 mm cap nut	38—42 N·m (3.8—4.2 kg-m, 27—30 ft-lb)	
8 mm cap nut	25—29 N·m (2.5—2.9 kg-m, 18—21 ft-lb)	
Cam sprocket bolt	16—20 N·m (1.6—2.0 kg-m, 12—15 ft-lb)	
Oil control bolt	20—25 N·m (2.0—2.5 kg-m, 15—18 ft-lb)	
Oil pipe bolt	10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)	
Spark plug sleeve	10—15 N·m (1.0—1.5 kg-m, 7—11 ft-lb)	Apply molybdenum disulfide grease to the threads
Spark plug	12—16 N·m (1.2—1.6 kg-m, 9—12 ft-lb)	
Timing hole cap	15—20 N·m (1.5—2.0 kg-m, 11—15 ft-lb)	Apply molybdenum disulfide grease to the threads
Insulator band	1—3 N·m (0.1—0.3 kg-m, 0.7—2.2 ft-lb)	
Assist shaft cap	20—24 N·m (2.0—2.4 kg-m, 15—17 ft-lb)	
Rocker arm shaft hole cap	35—45 N·m (3.5—4.5 kg-m, 25—33 ft-lb)	

TOOL

Special

Hydraulic tappet bleeder	07973—MJ00000
Valve guide reamer	07984—5510000 Not available in U.S.A.
	07984—657010A U.S.A. only
Fork tube holder Attachment	07930—KA50100

Common

Valve spring compressor	07757—0010000 or 07957—3290001
Valve guide remover	07742—0010200 or 07942—6570100
Valve guide driver	07743—0020000 Not available in U.S.A.

TROUBLESHOOTING

Engine top-end problems usually affect engine performance. These can be diagnosed by a compression test, or by tracing noises to the top-end with a sounding rod or stethoscope.

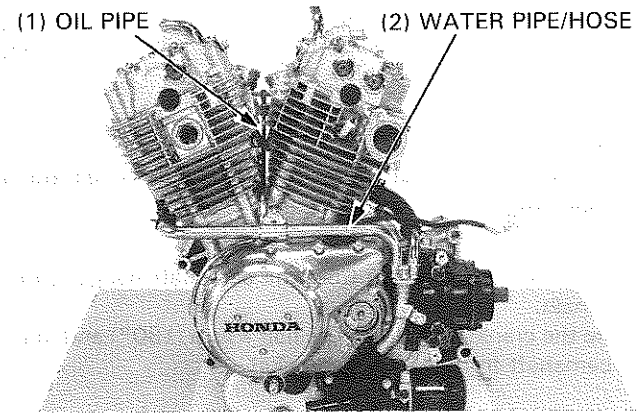
Low compression
- Valves
  - — Hydlaulic tappet locked (Engine will not start)
  - — Collapsed hydraulic tappet (Chatter noise)
- Insufficient air bleeding, noise will stop after about 10 minutes
  - — Burned or bent valves
  - — Broken or damaged valve springs
  - — Incorrect valve timing
  - — Valve stuck open
- Cylinder head
  - — Leaking or damaged head gasket
  - — Warped or cracked cylinder head
- Cylinder and piston (Refer to Section 11)

Compression too high
- — Excessive carbon build-up on piston or combustion chamber

Excessive noise
- Hydraulic tappet
  - — Worn or damaged tappet
  - — Clogged oil hole or oil passage to cylinder head
  - — Weak or damaged assist spring
  - — Worn or damaged assist shaft
  - — Worn or damaged rocker arm or shaft
  - — Worn or damaged rocker arm shaft mount hole in head cover
  - — Air in oil passage caused by low oil level
  - — Excessively worn valve seat
  - — Worn rocker arm follower or valve stem end
- Sticking valve or broken valve spring
- Weak valve spring
- Worn or damaged camshaft
- Worn or damaged cam chain
- Worn or damaged cam chain tensioner
- Worn cam sprocket

CYLINDER HEAD COVER REMOVAL

Remove the engine from the frame (section 5).
Remove the water pipe and water hoses.
Remove the oil pipe bolts and control bolt, then remove the oil pipe.

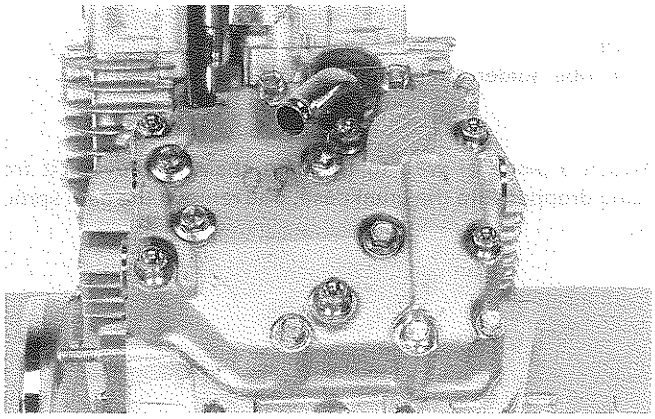


Remove the two 6 mm flange bolts, five 8 mm flange bolts, two 8 mm cap nuts and four 10 mm cap nuts in crisscross pattern in 2-3 steps.

Remove the water pipe from the cylinder head.

NOTE

- Tilt the engine about 40 degrees to the right or left when removing the front or rear cylinder head cover. The hydraulic tappets and shims may come out with the cylinder head cover. Be careful not to drop them into the crankcase.

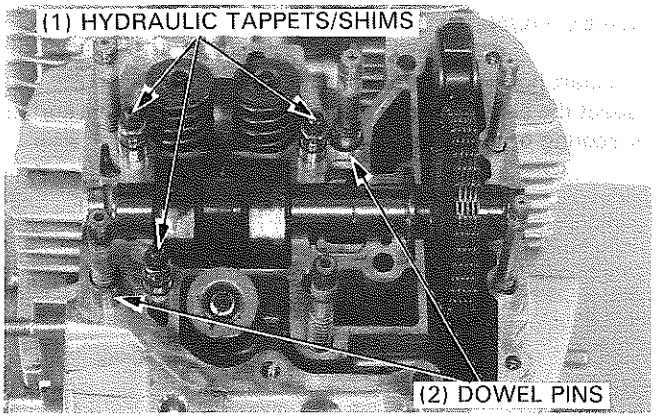


Remove the hydraulic tappets and shims.

CAUTION

- *Do not strike or use excessive force to remove the hydraulic tappets.*

Remove the dowel pins and camshaft grommets.

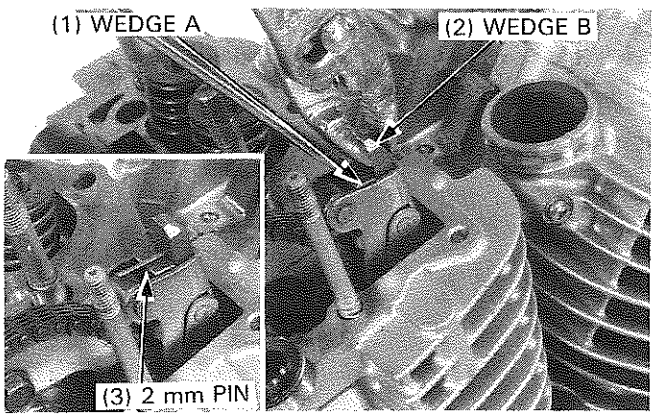


CAMSHAFT REMOVAL

Measure the distance of the cam chain tensioner projects above the bracket as shown. Replace the cam chain with a new one if the projection exceeds 9 mm (0.35 in).
To replace the cam chain, remove the following parts:

Front cylinder: Left crankcase cover and starter driven gear (section 8).
Rear cylinder: Right crankcase cover and primary drive gear (section 7).

Release the cam chain tensioner by pulling wedge A straight up while holding wedge B down, then secure wedge A with a 2 mm pin as shown.

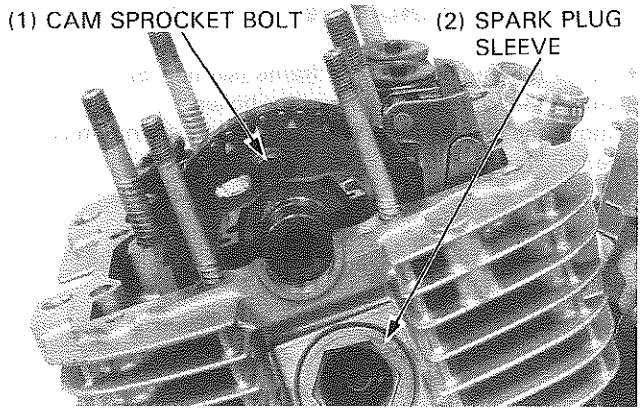


Remove the cam sprocket bolt.
Rotate the crankshaft clockwise one turn (360°) and remove the other cam sprocket bolt.

NOTE

- Be careful not to let the cam sprocket bolts fall into the crankcase.

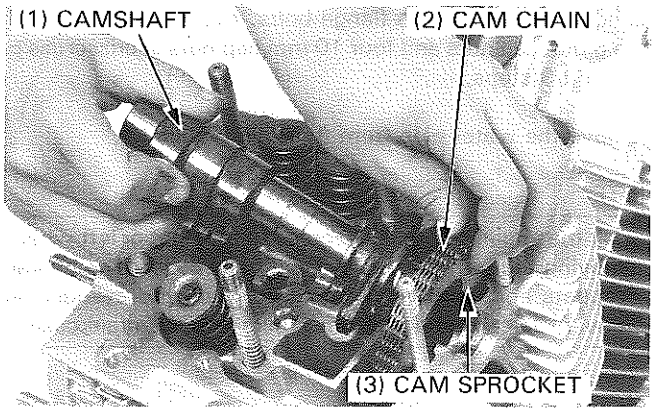
Remove the cam sprocket from the camshaft flange with the cam chain.
Rotate the crankshaft clockwise half a turn (180°) and remove the camshaft from the cam sprocket.



Remove the spark plug sleeve using the fork tube holder attachment from the spark plug hole on the cam chain side.

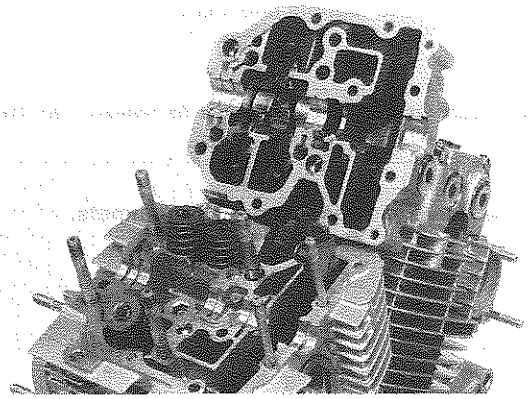
TOOL:
Fork tube holder attachment 07930—KA50100

Attach a piece of wire to the cam chain to prevent it from being dropped into the crankcase, and remove the cam sprocket.



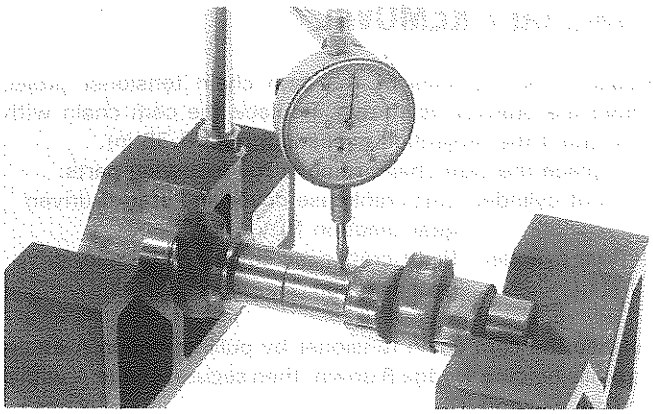
INSPECTION

Camshaft holder/cylinder head
Inspect the camshaft holder and cylinder head journal surfaces for scoring or evidence of insufficient lubrication.



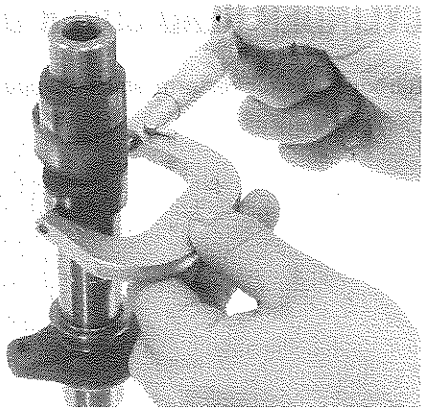
Camshaft runout
Check the camshaft runout with a dial indicator.
Support both ends of the camshaft with V blocks.

SERVICE LIMIT: 0.05 mm (0.002 in)

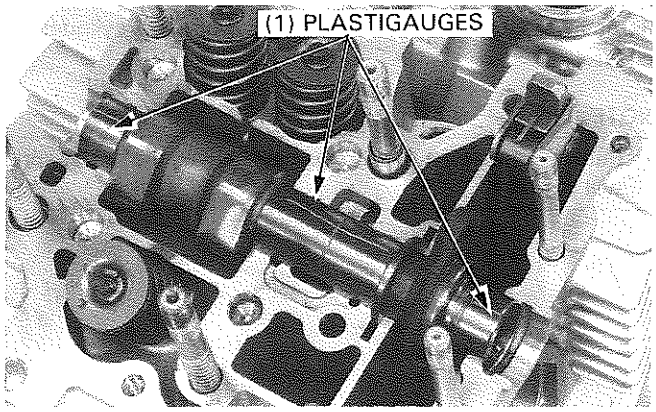


Cam lobe height
Measure the height of each cam lobe using a micrometer.

SERVICE LIMIT: 35.82 mm (1.410 in)



Camshaft bearing oil clearance.
Wipe any oil from the journals. Lay a strip of plastigauge lengthwise on top of each camshaft journal.



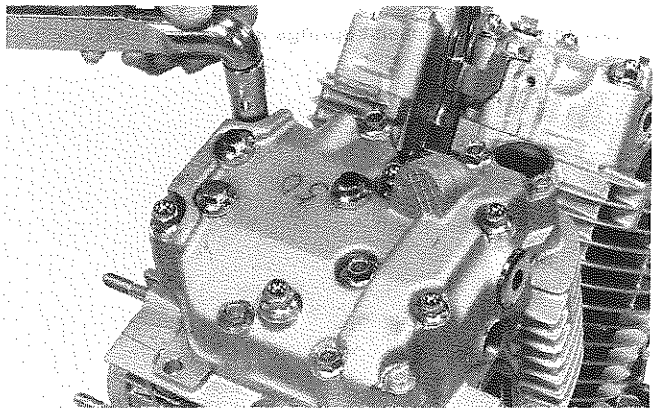
NOTE

- Avoid placing the plastigauge over the oil hole in the cam holder.

Hook the cam chain suspension wire against the cam chain guide or loosely install the spark plug sleeve to prevent the cam chain from being dropped into the crankcase.

NOTE

- Do not hook the wire against the head cover mating surface.



Install the dowel pins and cylinder head cover and tighten the bolts and nuts in a criss-cross pattern in 2-3 steps.

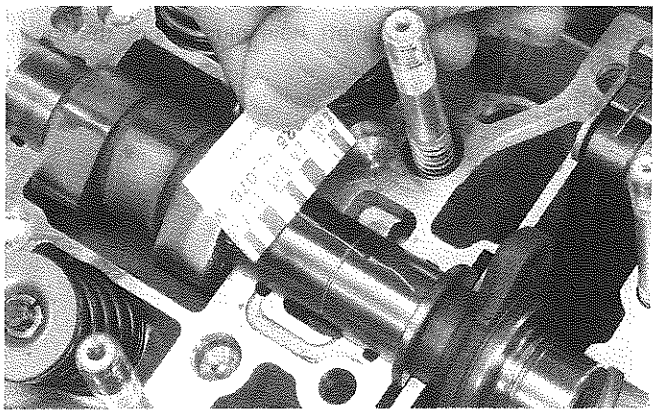
TORQUE:
10 mm cap nut: 38—42 N·m (3.8—4.2 kg-m, 27—30 ft-lb)
8 mm cap nut: 25—29 N·m (2.5—2.9 kg-m, 18—21 ft-lb)

NOTE

- Do not rotate the camshaft when using a plastigauge.

Remove the cylinder head cover and measure the width of each plastigauge. The widest thickness determines the oil clearance.

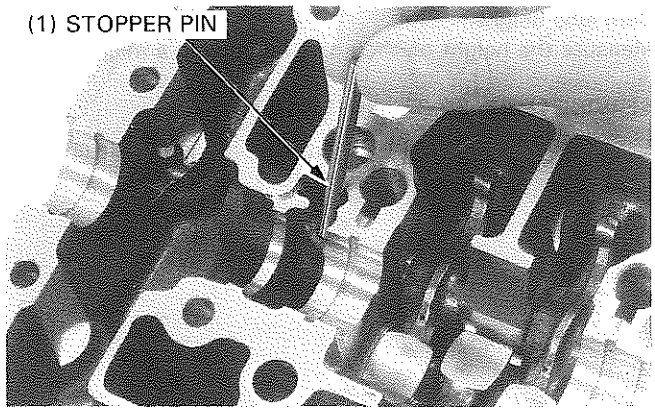
SERVICE LIMIT: 0.130 mm (0.0051 in)



When the service limits are exceeded, replace the camshaft and recheck the oil clearance.
Replace the cylinder head and cover if the clearance still exceeds the service limits.

CYLINDER HEAD COVER DISASSEMBLY

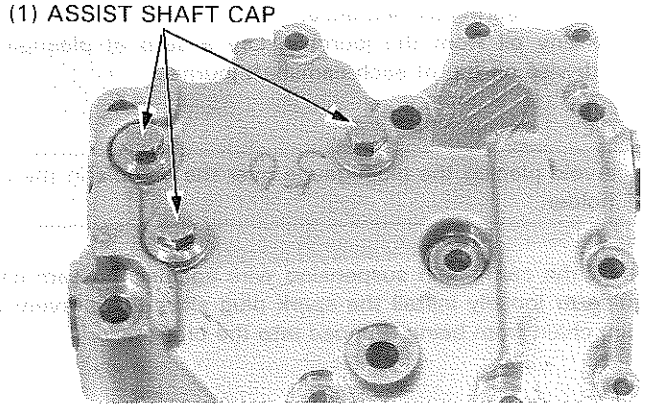
Remove the rocker arm shaft stopper pin from the cylinder head.



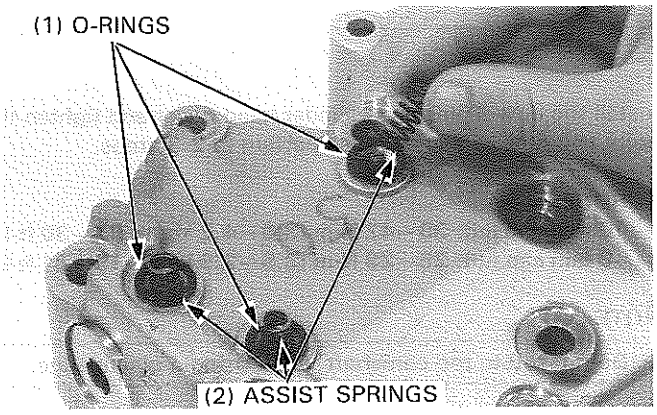
Remove the three assist shaft caps from the cylinder head cover.

NOTE

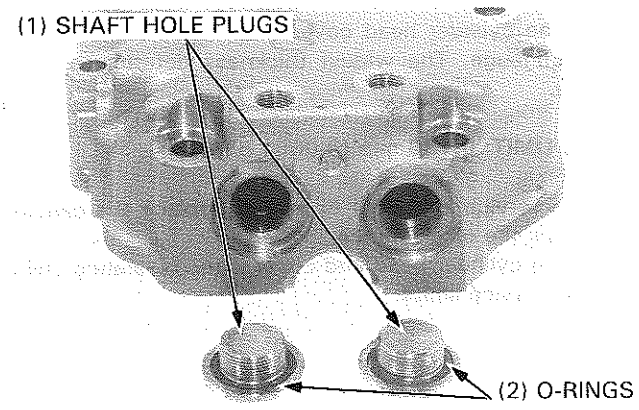
- Remove the assist shaft caps carefully as the assist springs will pop out.



Remove the O-rings, assist springs and assist shaft.



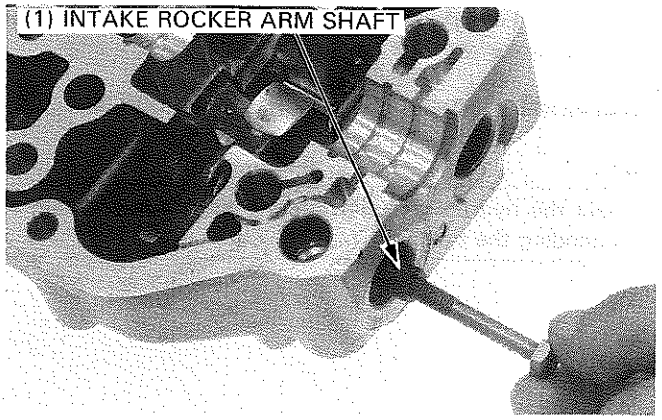
Remove the rocker arm shaft hole plugs from the cylinder head.



Thread a 6 mm bolt into the intake rocker arm shaft on the cam chain side and pull the bolt out to remove the shaft.
Remove the intake rocker arm shaft on the opposite side by tapping the cylinder head cover with a plastic hammer.

CAUTION

- *Be carefull not to damage the cylinder head cover mating surface.*



Thread a 6 mm bolt into the exhaust rocker arm shaft and pull the bolt to remove the shaft.
Remove the rocker arms.

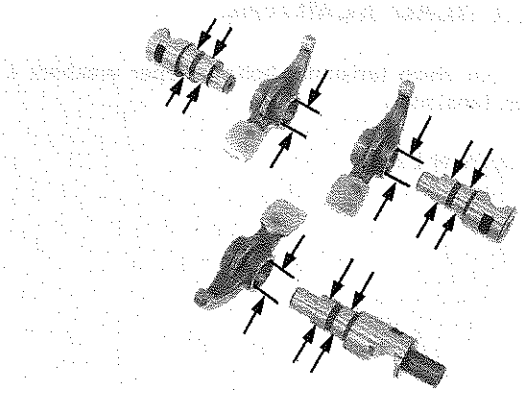
INSPECTION

Rocker arm shaft/rocker arm
Inspect the rocker arm shafts and rocker arms for wear or damage.
Check the rocker arms for clogged oil holes.
Measure the O.D. of each rocker arm shaft.

SERVICE LIMIT: 13.706 mm (0.5396 in)

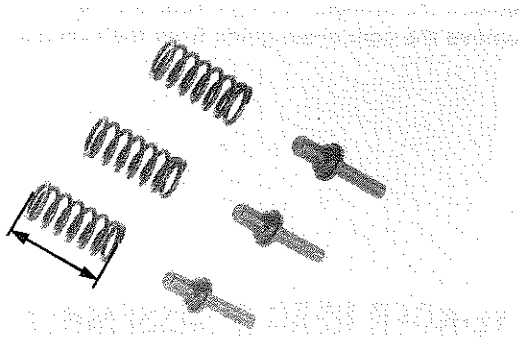
Measure the I.D. of each rocker arm.

SERVICE LIMIT: 13.778 mm (0.5424 in)



Assist springs and shafts
Inspect the assist springs and shafts for wear or damage.
Measure the assist spring free length.

SERVICE LIMIT: 17.80 mm (0.701 in)



Hydraulic tappets
Inspect the hydraulic tappets for wear, damage and plugged holes.

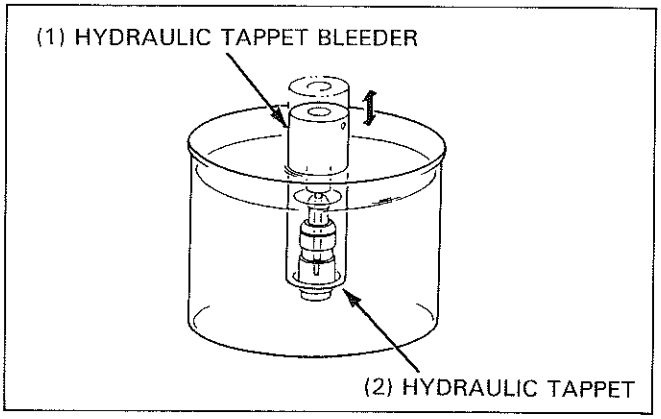
Measure the free length of each hydraulic tappet as follows:
Attach the Hydraulic Tappet Bleeder to the hydraulic tappet and compress and extend the hydraulic tappet slowly in a jar filled with kerosene.

NOTE

- Keep the hydraulic tappet below the surface of kerosene while priming the hydraulic tappet.

Continue operating the hydraulic tappet until the air bubbles stop and the tappet no longer collapses.

TOOL:
Hydraulic tappet bleeder **07973—MJ00000**

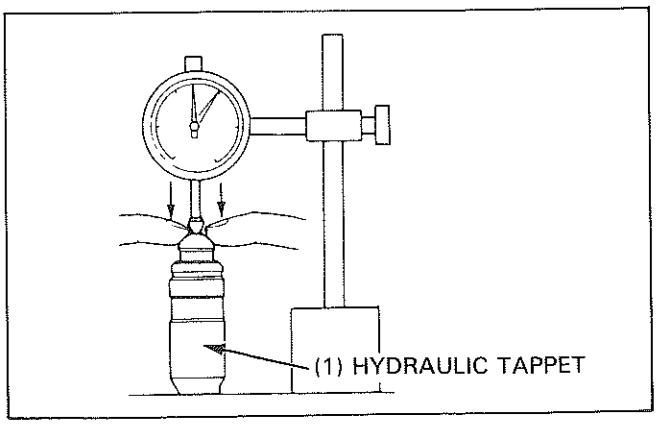


Quickly try to compress the tappet by hand. Measure the compression stroke with the dial gauge.

COMPRESSION STROKE: 0—0.2 mm (0—0.008 in)

NOTE

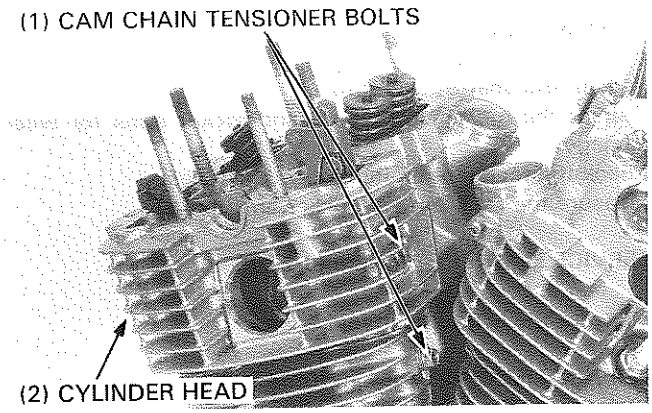
- Hold the hydraulic tappet upright while compressing and extending the hydraulic tappet.



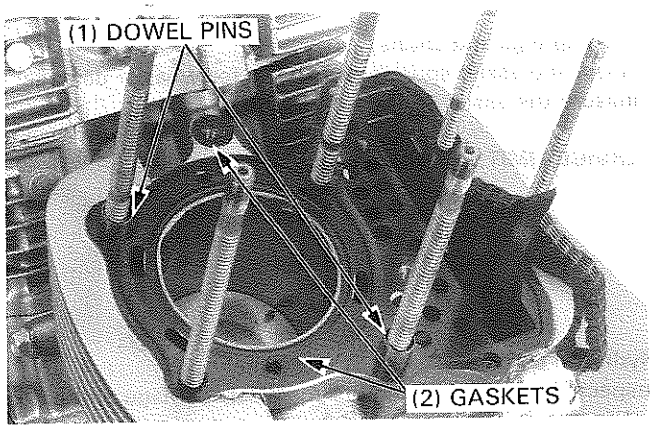
CYLINDER HEAD REMOVAL

Remove the cam chain tensioner bolts, copper washers and the cam chain tensioner.

Remove the cylinder head.



Remove the cylinder head gaskets and dowel pins.
Remove the cam chain guide from the cylinder.



CYLINDER HEAD DISASSEMBLY

Remove the valve spring cotters, retainers, springs and valves using a Valve Spring Compressor.

TOOL:

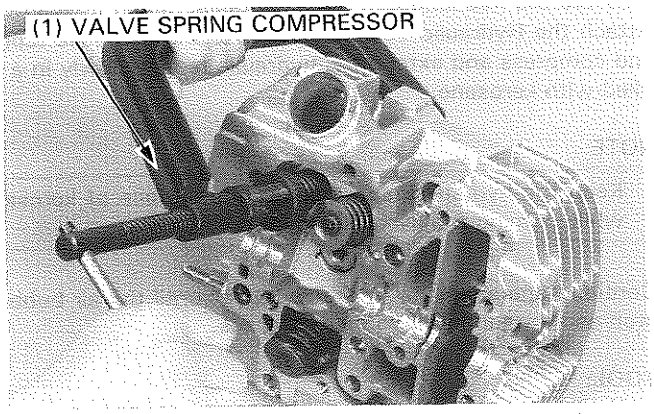
Valve spring compressor	**07757—0010000 or 07957—3290001**

CAUTION

- *To prevent loss of tension, do not compress the valve springs more than necessary when removing the cotters.*
- *Avoid damaging the sliding surfaces of the hydraulic tappets.*

NOTE

- Mark all parts during disassembly so they can be placed back in their original locations.

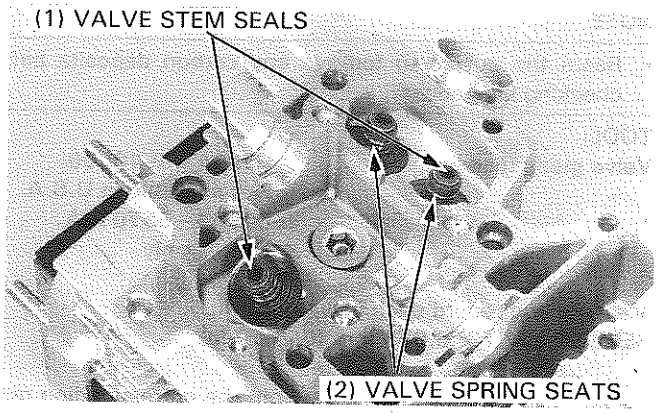


Remove the valve stem seals and valve spring seats.

Remove carbon deposits from the combustion chamber and clean off the head gasket surfaces.

NOTE

- Avoid damaging the gasket surfaces.
- Gaskets will come off easier if soaked in solvent.

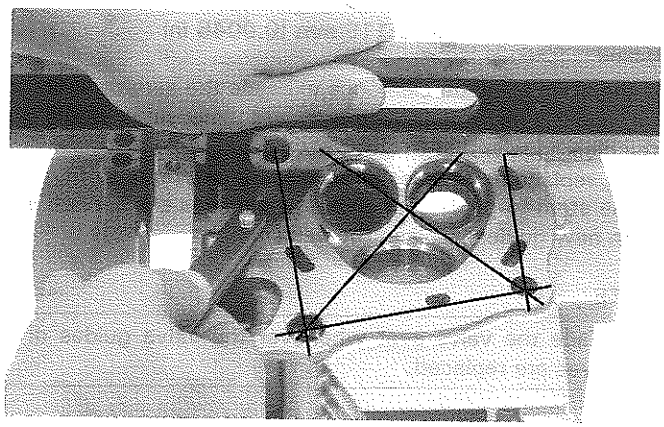


INSPECTION

Cylinder head
Check the spark plug hole and valve areas for cracks.

Check the cylinder head for warpage with a straight edge and feeler gauge.

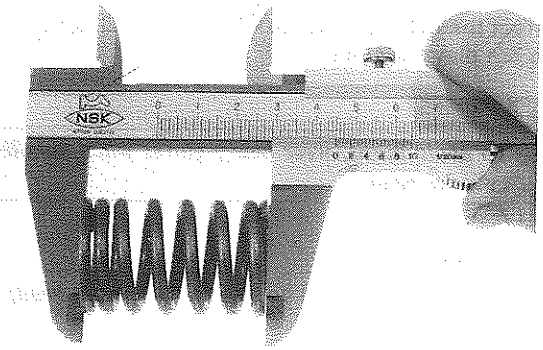
SERVICE LIMIT: 0.10 mm (0.0040 in)



Valve springs
Measure the free length of the inner and outer valve sprins.

SERVICE LIMITS:
INNER (IN): 36.40 mm (1.433 in)
(EX): 36.40 mm (1.433 in)
OUTER (IN): 43.90 mm (1.728 in)
(EX): 41.80 mm (1.646 in)

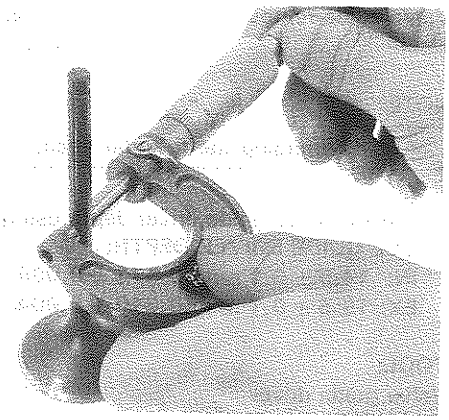
Replace the springs if they are shorter than the service limits.



Valve stem-to-guide clearance
Inspect each valve for bending, burning, scratches or abnormal stem wear.

Check valve movement in the guide and measure and record each valve stem O.D.

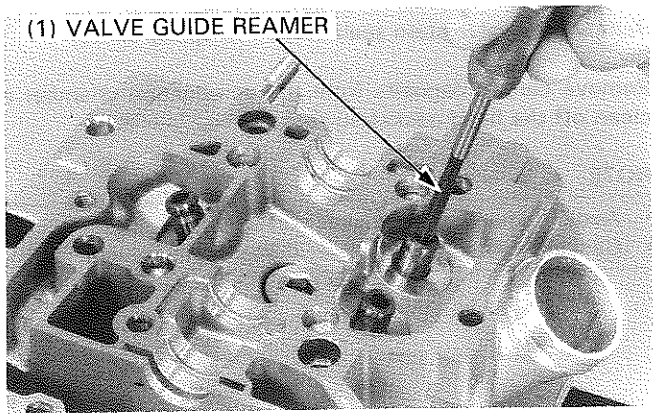
SERVICE LIMIT: IN: 6.56 mm (0.258 in)
EX: 6.54 mm (0.257 in)



NOTE

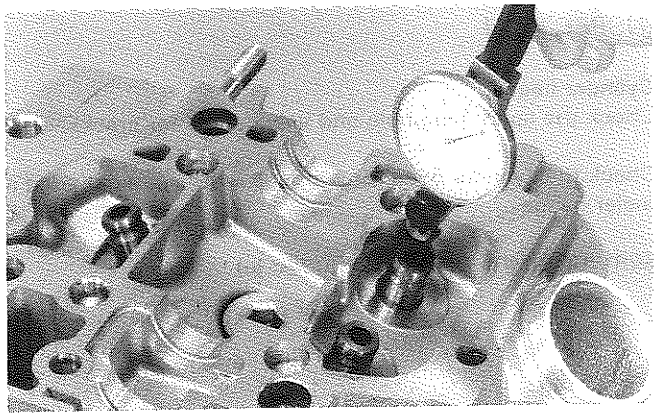
- Ream the guides to remove any carbon deposits before checking clearances.

TOOL:
Valve guide reamer — **07984—5510000 Not available in U.S.A. 07984—657010A U.S.A. only**



Measure and record each valve guide I.D.
SERVICE LIMITS: 6.655 mm (0.2620 in)

Subtract each valve stem O.D. from the corresponding guide I.D. to obtain the stem-to-guide clearance.
SERVICE LIMITS: IN: 0.075 mm (0.0030 in)
EX: 0.115 mm (0.0045 in)



If the stem-to-guide clearance exceeds the service limits, determine if a new guide with standard dimensions would bring the clearance within tolerance.
If so, replace any guides as necessary and ream to fit.
If the stem-to-guide clearance still exceeds the service limits with new guides, replace the valves.

NOTE

- Reface the valve seat whenever the valve guides or the valves are replaced.

VALVE GUIDE REPLACEMENT

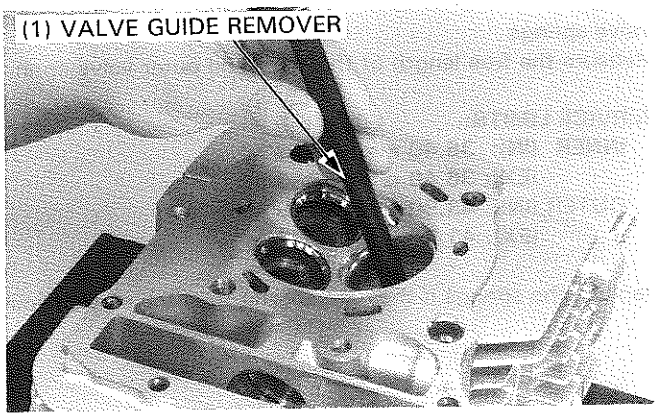
Heat the cylinder head to 100°—150°C (212°—300°F) with a hot plate or oven.

WARNING

- ***To avoid burns, wear heavy gloves when handling the heated cylinder head.***

CAUTION

- *Do not use a torch to heat the cylinder head; it may cause warping.*

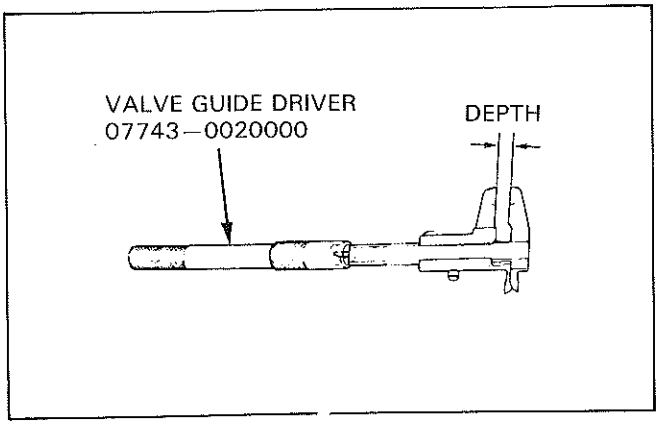


Support the cylinder head and drive out the old guides from the combustion chamber side of the cylinder head.
TOOL:
Valve guide remover — **07742—0010200 or 07942—6570100**

NOTE

- Avoid damaging the cylinder head.

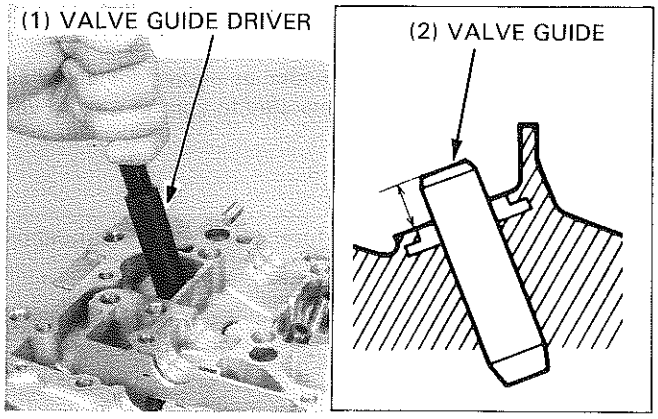
Adjust the valve guide driver depth using a vernier caliper.
VALVE GUIDE DRIVER DEPTH:
IN: 14.5 ± 0.1 mm (0.571 ± 0.004 in)
EX: 15.5 ± 0.1 mm (0.610 ± 0.004 in)



TOOL:
Valve guide driver — **07743—0020000 Not available in U.S.A.**

Drive new guides in from the rocker arm side of the cylinder head.

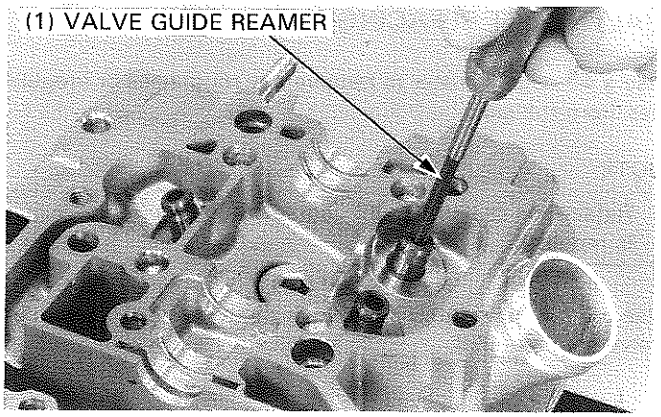
VALVE GUIDE PROJECTION ABOVE CYLINDER HEAD:
IN: 14.5 ± 0.1 mm (0.571 ± 0.004 in)
EX: 15.5 ± 0.1 mm (0.610 ± 0.004 in)



Ream the new valve guides after installation.

TOOL:

Valve guide reamer	**07984–5510000** **Not available in U.S.A.** **07984–657010A** **U.S.A. only**



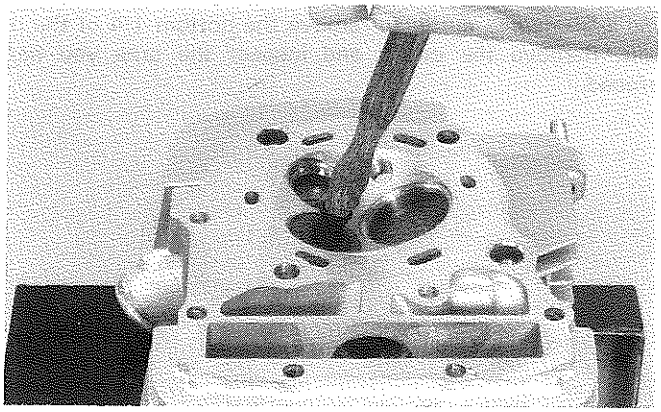
NOTE

- Use cutting oil on the reamer during this operation.
- It is important that the reamer always be rotated in the same direction when it is inserted or removed.

Clean the head thoroughly after reaming the valve guides.

VALVE SEAT INSPECTION/REFACING

Clean all intake and exhaust valves thoroughly to remove carbon deposits.

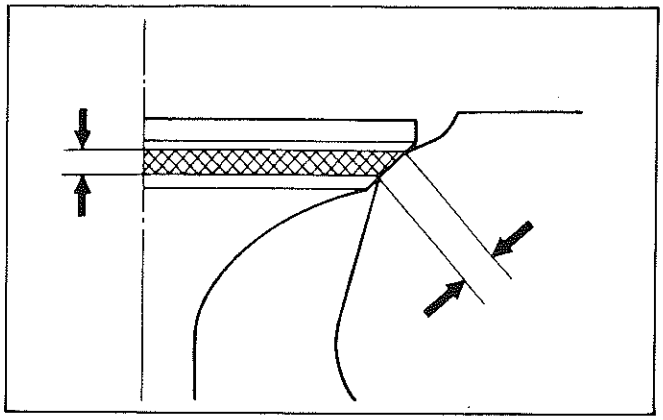


Apply a light coating of Prussian Blue to each valve seat. Lap each valve and seat using a rubber hose or other hand-lapping tool.

Remove and inspect each valve.

CAUTION

- *The valves cannot be ground. If the valve face is burned or badly worn or if it contacts the seat unevenly, replace the valve.*



Inspect the width of each valve seat.

STANDARD: 0.90–1.10 mm (0.035–0.043 in)
SERVICE LIMIT: 1.50 mm (0.059 in)

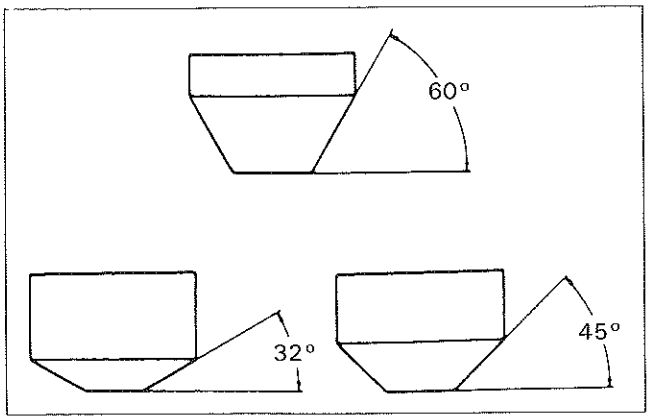
If the seat is too wide, too narrow or has low spots, the seat must be ground.

VALVE SEAT CUTTERS

Honda Valve Seat Cutters, grinder or equivalent valve seat refacing equipment are recommended to correct a worn valve seat.

NOTE

- Follow the refacer manufacturer's operating instructions.



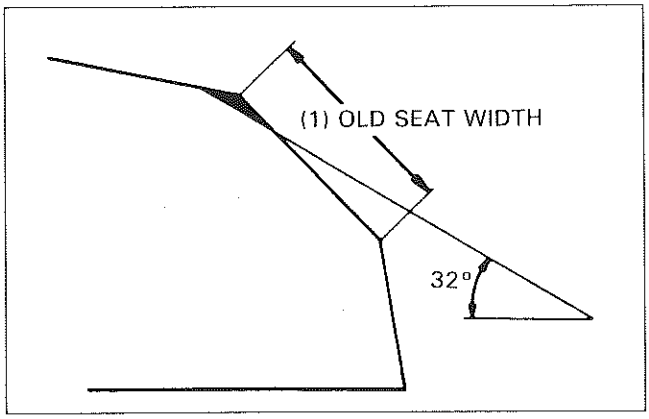
VALVE SEAT REFACING

Use a 45 degree cutter to remove any roughness or irregularities from the seat.

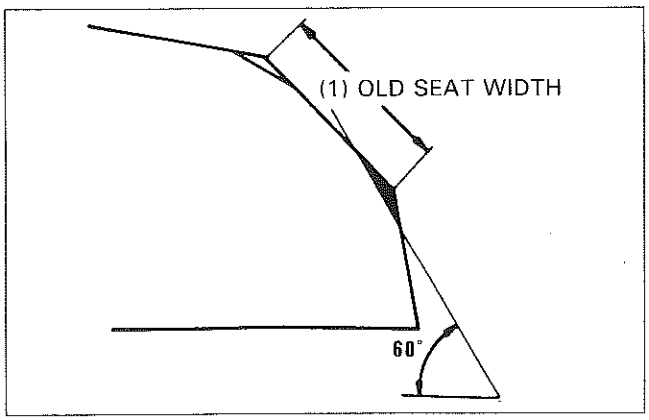
NOTE

- Reface the seat with a 45 degree cutter when a valve guide is repalced.

Use a 32 degree cutter to remove the top 1/4 of the existing valve seat material.

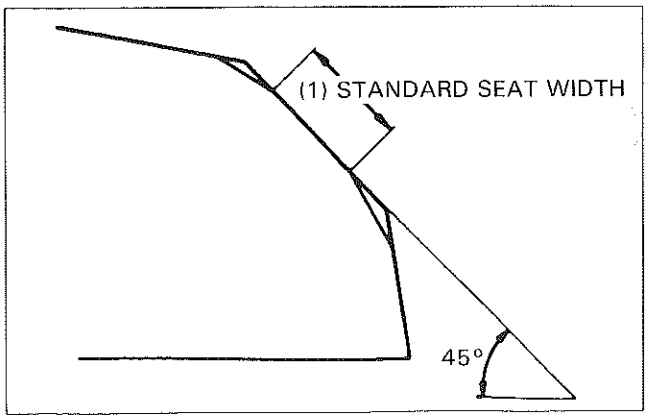


Use a 60 degree cutter to remove the bottom 1/4 of the old seat. Remove the cutter and inspect the area you have refaced.



Install a 45 degree finish cutter and cut the seat to the proper width. Make sure that all pitting and irregularities are removed. Refinish if necessary.

STANDARD SEAT WIDTH:
0.90—1.10 mm (0.035—0.043 in)

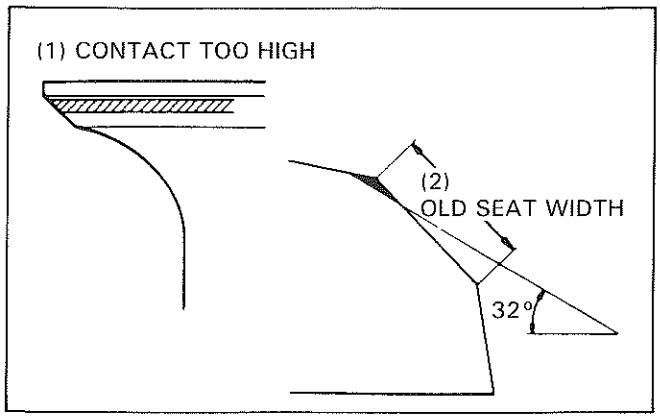


Apply a thin coating of Prussian Blue to the valve seat. Insert the valve into the valve guide and onto the seat to make a clear pattern.

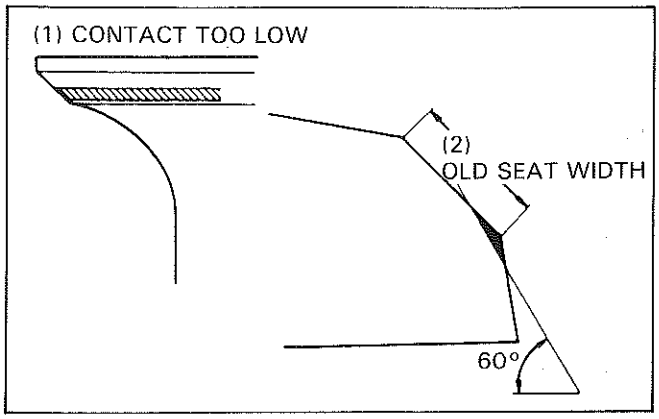
NOTE

- The location of the valve seat in relation to the valve face is very important for good sealing.

If the contact area is too high on the valve, the seat must be lowered using a 32 degree flat cutter.



If the contact area is too low on the valve, the seat must be raised using a 60 degree inner cutter.



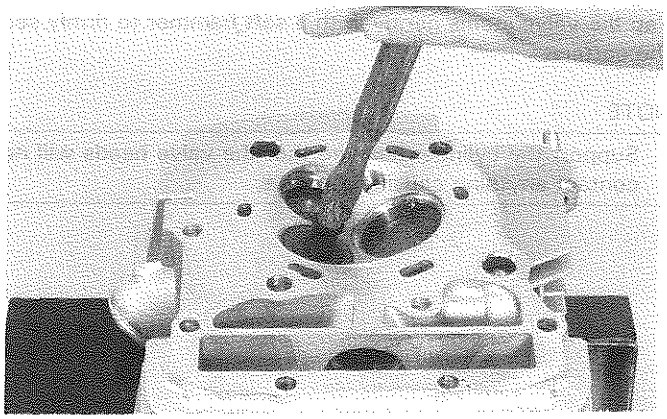
Refinish the seat to specifications, using a 45 degree finish cutter.

STANDARD SEAT WIDTH:
0.90–1.10 mm (0.035–0.043 in)

After cutting the seat, apply lapping compound to the valve face, and lap the valve using light pressure.
After lapping, wash all residual compound off the cylinder head and valve.

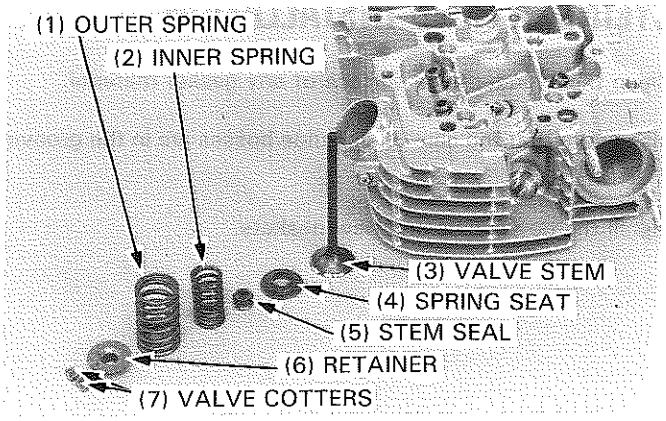
NOTE

- Do not allow lapping compound to enter the guides.



CYLINDER HEAD ASSEMBLY

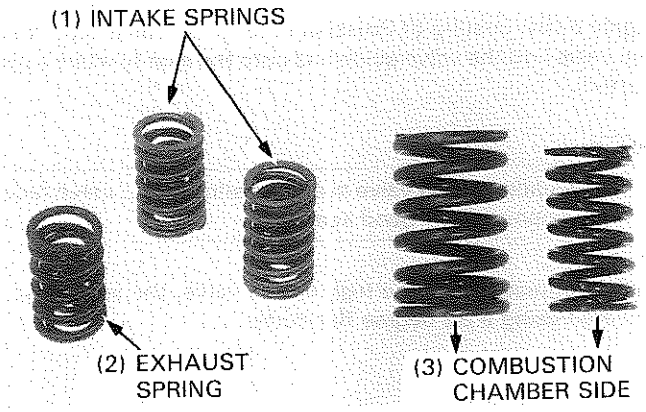
Install the valve spring seat and a new stem seal.
Lubricate each valve stem with molybdenum disulfide grease and insert the valve into the valve guide.
To avoid damage to the stem seal, turn the valve slowly when inserting.



Install the valve springs and retainers. The springs tightly wound coils should face in toward the combustion chamber.

NOTE

- Springs with green paint are exhaust valve springs.



Compress the valve spring with the valve spring compressor.

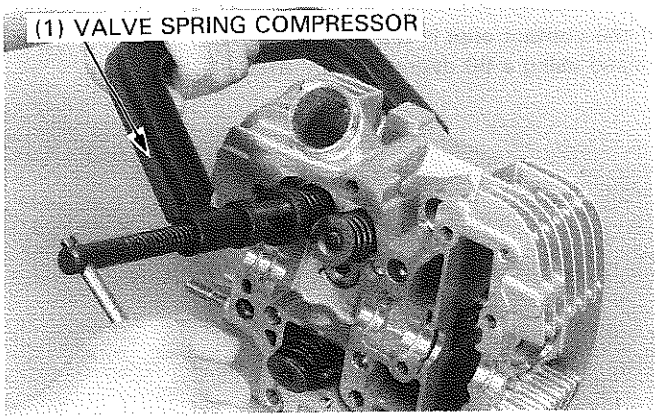
Install the valve cotters.

CAUTION

- *To prevent loss of tension, do not compress the valve springs more than necessary to install the valve cotters.*
- *Select the proper retainer for the compressor to prevent any contact with the head.*

TOOL:

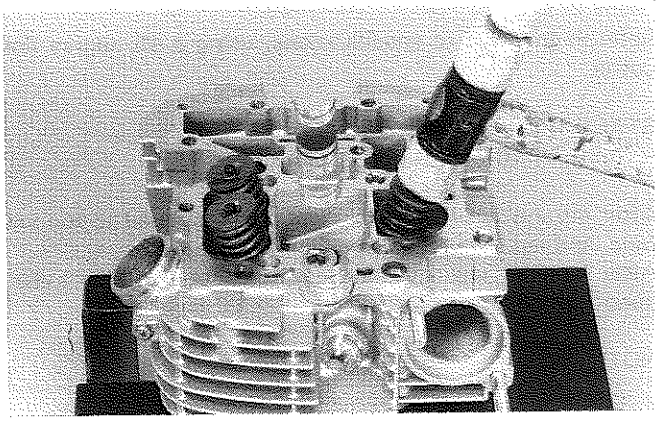
Valve spring compressor	**07757—0010000 or 07957—3290001**



Tap the valve stems gently with a soft hammer to firmly seat the cotters.

NOTE

- Support the cylinder head so that the valve heads will not contact anything causing damage.

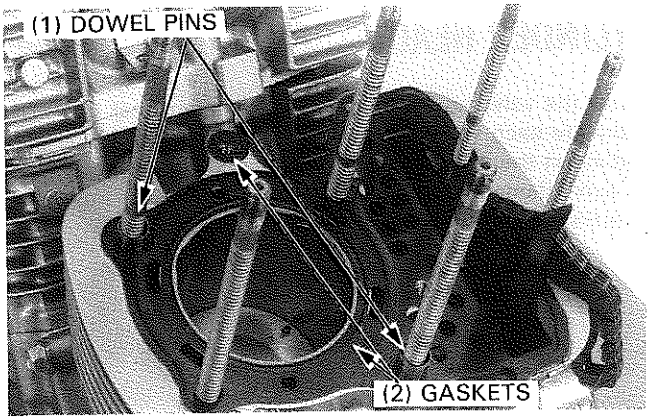


CYLINDER HEAD INSTALLATION

Clean the cylinder head surface of any gasket material.

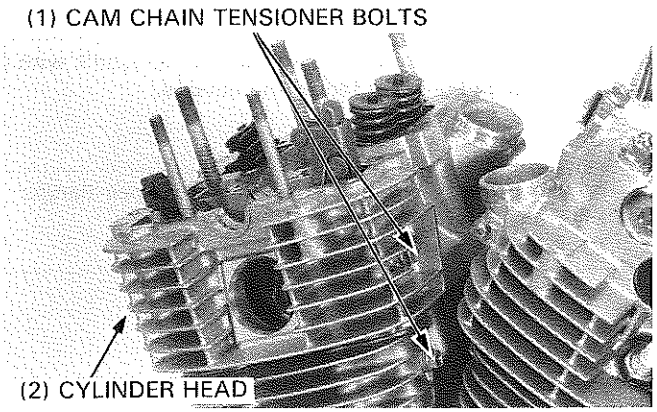
Make sure that the cam chain guide bosses are in the grooves of cylinder.

Install the dowel pins and new gaskets.



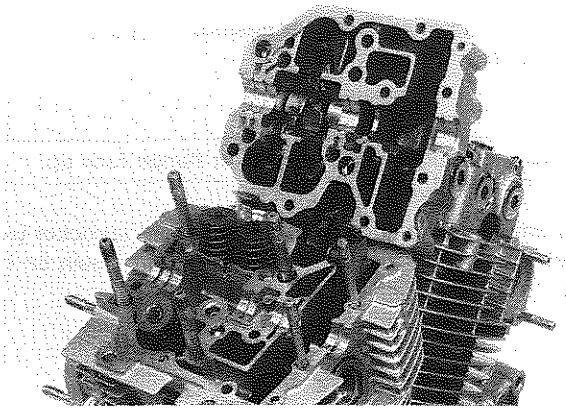
Install the cylinder head.

Install the cam chain tensioner with the bolts and sealing washers.



CAMSHAFT INSTALLATION

Lubricate the camshaft journal surface of the cylinder head with molybdenum disulfide grease.



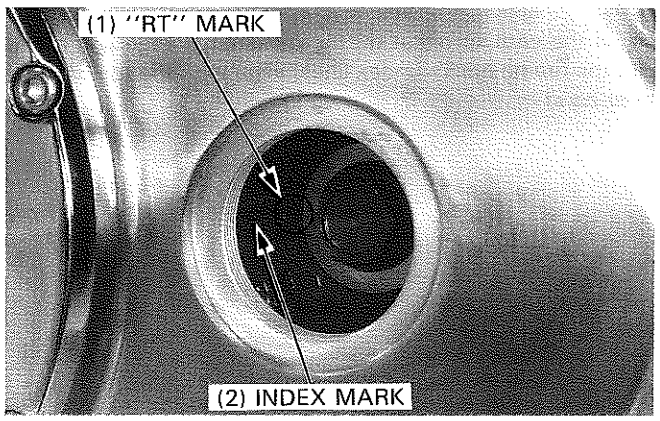
NOTE

- If both the front and rear camshafts were removed, start the installation with front cylinder as described below.
- Even if you are servicing either the front or rear cylinder head, the other cylinder head cover must be removed and the other camshaft position must be checked.

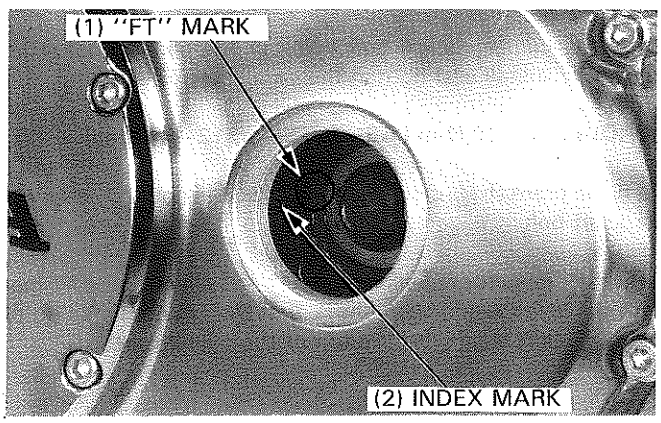
FRONT CYLINDER

NOTE

- If the rear cylinder has not been serviced, remove the rear cylinder head cover and check the rear cylinder camshaft position as follows:
  Remove the timing hole cap, turn the crankshaft clockwise and align the "RT" mark on the primary drive gear with the index mark on the right crankcase cover, then check the identification mark on the camshaft flange.
  If the "R" mark on the camshaft flange faces up, turn the crankshaft clockwise 495° and begin installation of the front camshaft.
  If the "R" mark faces down (cannot be seen), turn the crankshaft clockwise 135° and begin installation.



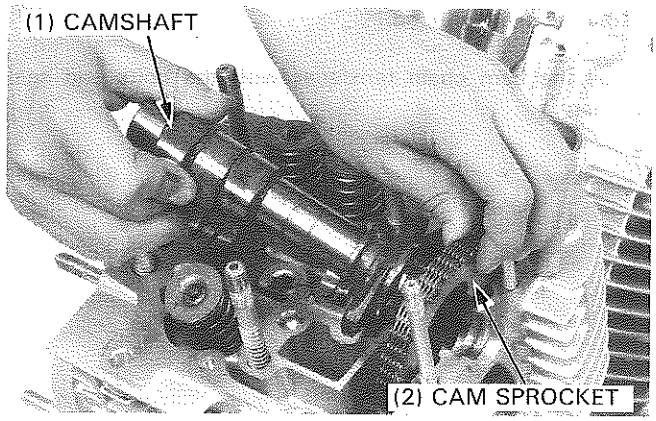
Align the "FT" mark on the primary drive gear with the index mark on the right crankcase cover.



Install the camshaft on the cylinder head through the cam chain and install the cam sprocket on the camshaft with the timing marks (index lines) facing the outside.

NOTE

- The camshafts are identified by marks on their flangs:
  "F" Front cylinder camshaft
  "R" Rear cylinder camshaft

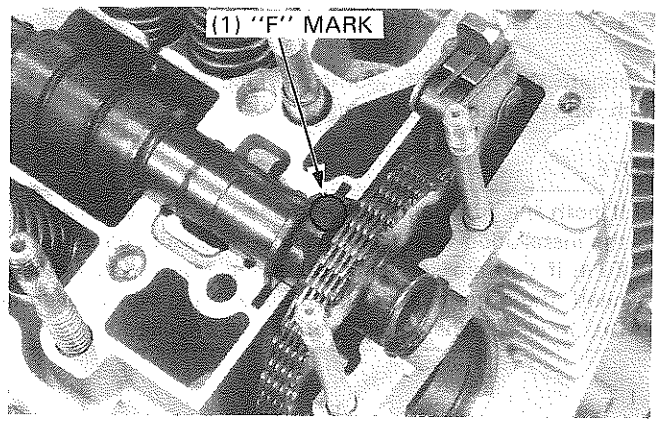


Place the camshaft into its correct position with the "F" mark on the flange facing up.

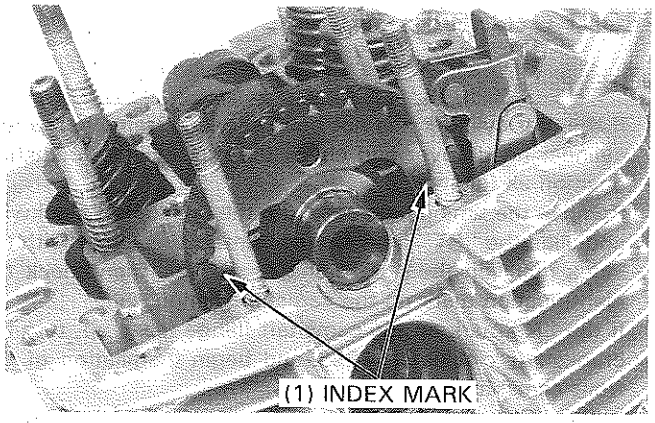
NOTE

- Make sure the edges on the sprocket flange face up.

Align the timing marks (index lines) on the cam sprocket with the top of the cylinder head and place the cam chain on the sprocket.



Install the cam sprocket on the camshaft flange and recheck that the timing marks (index lines) align with the top of the cylinder head.

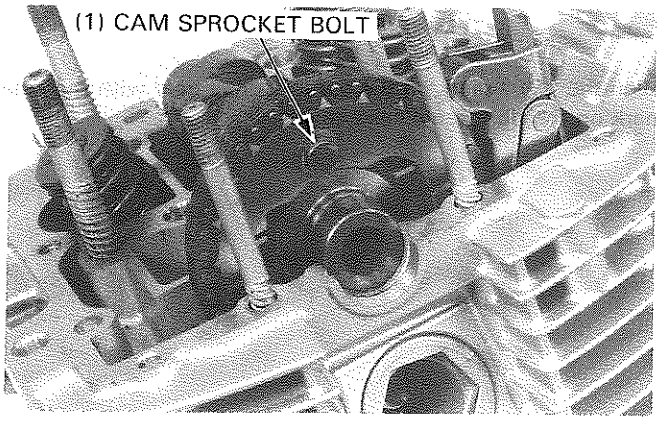


Align the cam sprocket bolt holes in the cam sprocket and camshaft, install and tighten the cam sprocket bolt.

TORQUE: 16–20 N·m (1.6–2.0 kg-m, 12–14 ft-lb)

Turn the crankshaft clockwise 360° and install the other cam sprocket bolt.

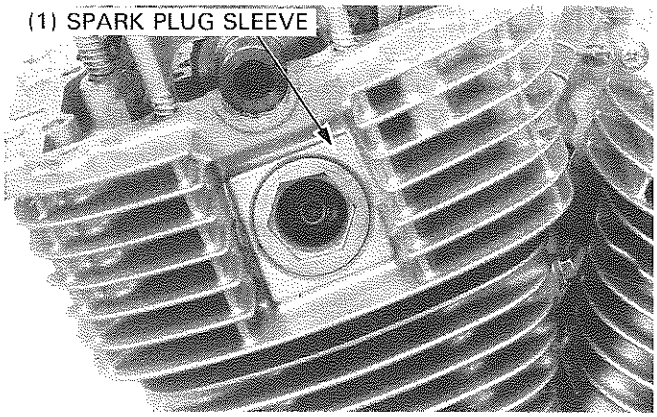
Turn the crankshaft clockwise 360° and align the "FT" mark with the index mark, then check that the timing marks on the cam sprocket align with the top of the cylinder head.



Check that the O-ring on the spark plug sleeve is in good condition.
Apply molybdenum disulfide grease to the spark plug sleeve and install the sleeve with the special tool (07930—KA50100).

TORQUE: 10—15 N·m (1.0—1.5 kg-m, 7—11 ft-lb)

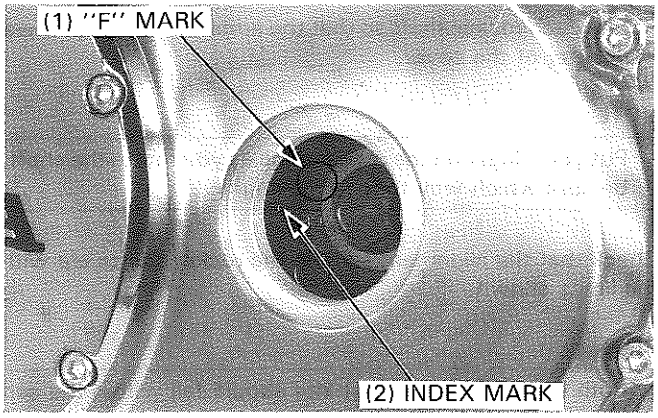
After installing the front cylinder camshaft, turn the crankshaft clockwise 225° and align the "RT" mark with the index mark on the right crankcase cover, then install the rear cylinder camshaft.



REAR CYLINDER

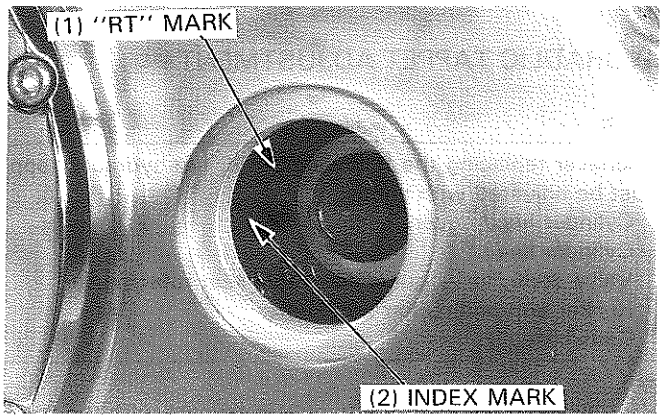
NOTE

- If the front cylinder was not serviced, remove the front cylinder head cover and check the front cylinder camshaft position as follows:
  Remove the timing hole cap, turn the crankshaft clockwise and align the "FT" mark on the primary drive gear with the index mark on the right crankcase cover, then check the identification mark on the camshaft flange.
  If the "F" mark on the camshaft flange face up, turn the crankshaft clockwise 225° and begin installation of the rear camshaft.
  If the "F" mark faces down (cannot be seen), turn the crankshaft clockwise 585° and begin installation.

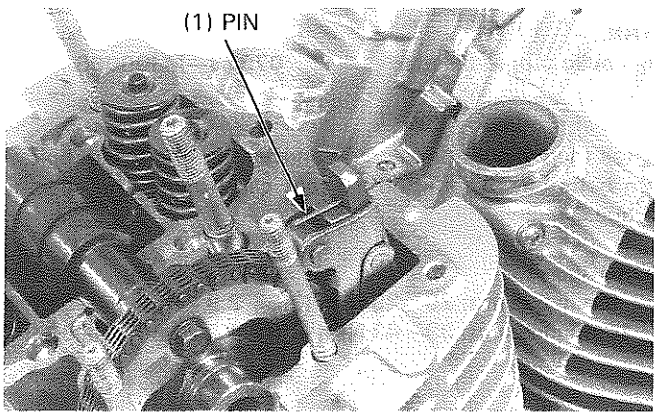


Make sure that the "RT" mark on the primary drive gear aligns with the index mark on the right crankcase cover.

Place the camshaft into its correct position with the "R" mark on the flange facing up and install the cam sprocket in the same procedure as for the front cylinder.

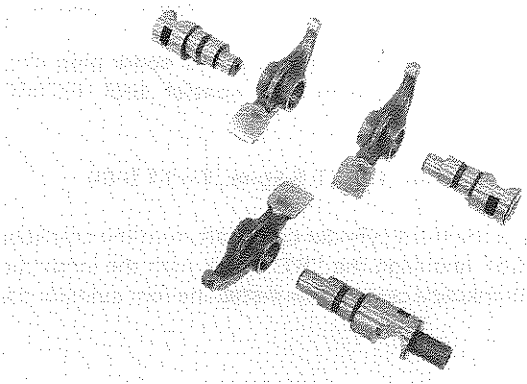


Remove the 2 mm pin holding the cam chain tensioner wedge A.



CYLINDER HEAD COVER ASSEMBLY

Brush Molybdenum Disulfide grease on the slipper surfaces of the rocker arms and coat the contact surfaces of the rocker shafts with clean engine oil.

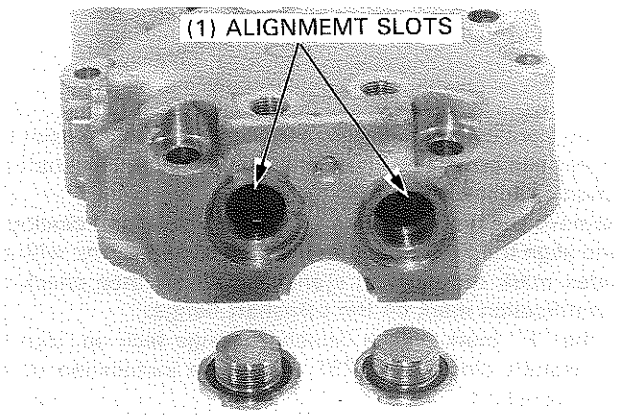


Install the rocker arms and shafts into the cylinder head cover, making sure that the assist shaft slots are facing up.

Rotate each rocker shaft so that the arms are moved in toward the center of the cover.

NOTE

- Put your finger on the rocker arms as you rotate the shaft to be sure which way they're moving.



Check that the alignment slots in the rocker shafts are within the limits shown.

NOTE

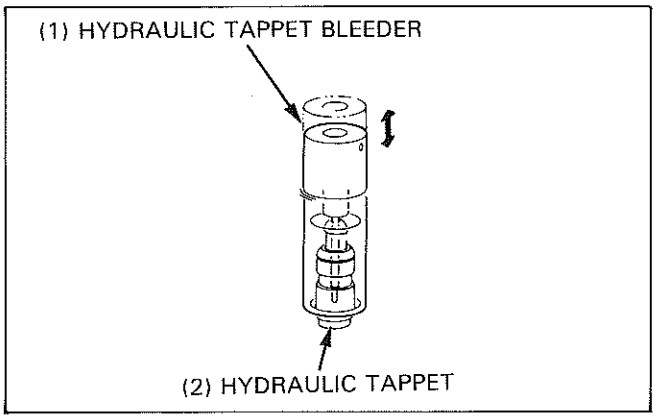
- Both intake rocker arm shafts should fall within the same limits.

HYDRAULIC TAPPET ADJUSTMENT

NOTE

Whenever replacing the following parts, the hydraulic tappet must be adjusted with shims.

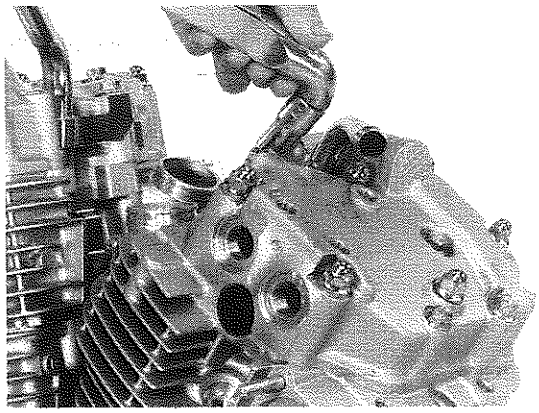
- Cylinder head cover.
- Cylinder head.
- Valve stem, valve guide and valve seat refacing.
- Rocker arm and rocker arm shaft.
- Camshaft.



After bleeding the oil in the hydraulic tappets with the tappet bleeder, install the tappets into the cylinder head.

TOOL:

Hydraulic tappet bleeder	**07973—MJ00000**



Install the cylinder head cover and tighten the 6 mm bolts, 8 mm bolts and 8 mm and 10 mm cap nuts to the specified torque.

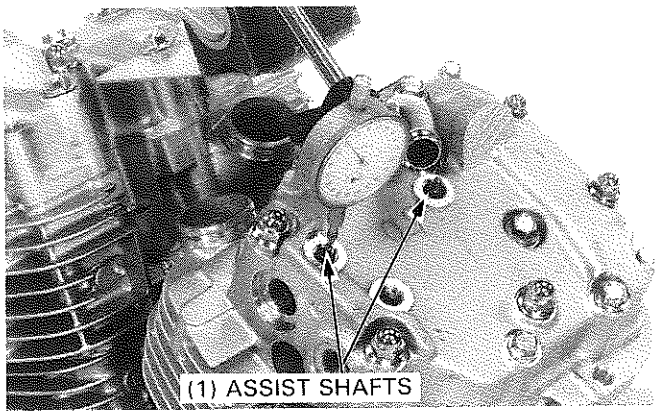
TORQUE:

8 mm cap nut: 25—29 N·m (2.5—2.9 kg-m, 18—21 ft-lb)
10 mm cap nut: 38—42 N·m (3.8—4.2 kg-m, 27—30 ft-lb)

Install the assist shafts into their holes in the cylinder head cover.

Rotate the crankshaft clockwise and align the "FT" ("RT") mark with the index mark.

Install a gear holder or equivalent plate to the front or rear cylinder head cover as shown and place the dial indicator on the assist shaft.
Measure the assist shaft stroke by rotating the crankshaft clockwise two times.



NOTE

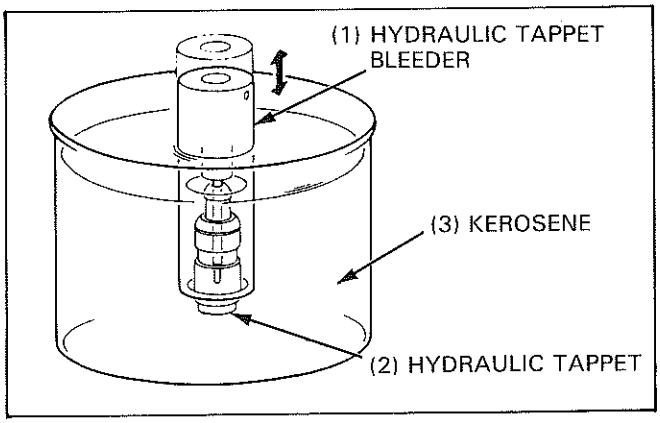
- The amount of assist shaft stroke will determine the number of tappet shims needed.

Determine and record the number of shims required for each tappet according to the following chart.

Assist shaft stroke	Number of shims needed 0.5 mm (0.02 in)
0—1.20 mm (0—0.047 in)	0
1.20—1.50 mm (0.047—0.059 in)	1
1.50—1.80 mm (0.059—0.070 in)	2
1.80—2.10 mm (0.070—0.083 in)	3
2.10—2.40 mm (0.083—0.094 in)	4
2.40—2.70 mm (0.094—0.106 in)	5

CYLINDER HEAD COVER INSTALLATION

Place the tappet in a container filled with kerosene.
Place the tappet bleeder into the tappet.
Hold the tappet upright and pump the tappet until air bubles stop coming out. Remove the tool, and try to quickly compress the tappet by hand. You should not be able to compress it more than 0.2 mm (0.008 in).
Remove the tappet from the fluid keeping it upright.



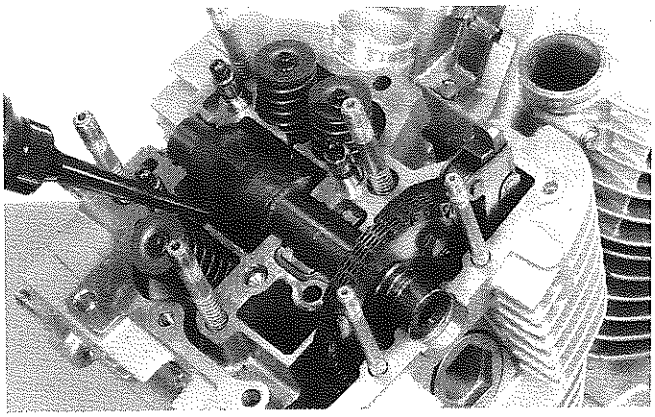
TOOL:
Hydraulic tappet bleeder 07973—MJ00000

Install the shims into each hydraylic tappet hole of the cylinder head.
Install the hydraulic tappets into the cylinder head.

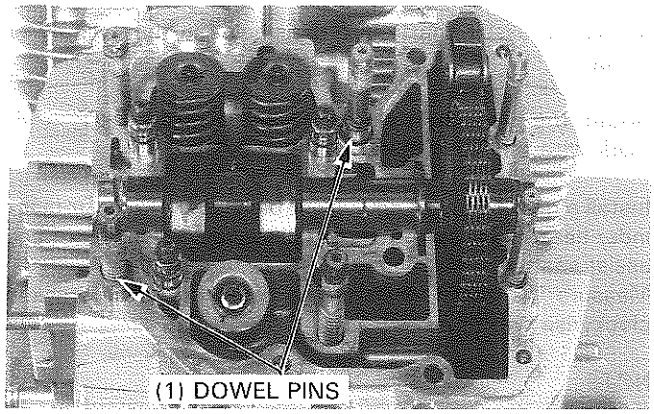
CAUTION

- *Do not tilt the hydraulic tappets more than necessary keep them as upright as possible.*

Fill the oil pocket with recommended oil.



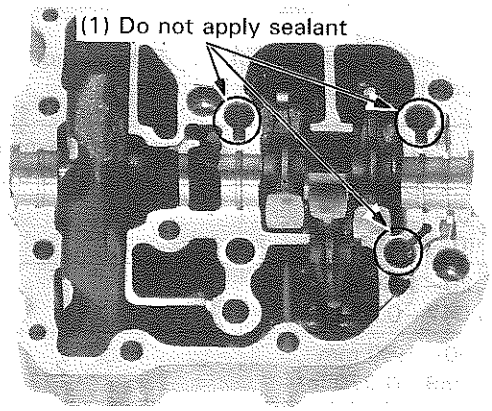
Install the dowel pins to the cylinder head.



Apply a liquid sealant to the mating surfaces of the cylinder head cover.

NOTE

- Do not apply liquid sealant to the shadowed area. Failure to do so could cause a hydraulic tappet failure.

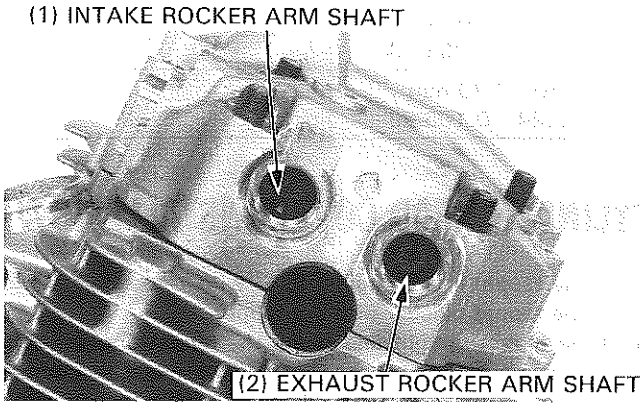


Rotate the crankshaft clockwise and align the timing mark (FT or RT) on the pulse generator rotor with the index mark on the right crankcase cover.

Install the cylinder head cover.
Check that the slots in the exhaust and intake rocker arm shafts are within the limits shown.
If not, repeat the preceding step and recheck.

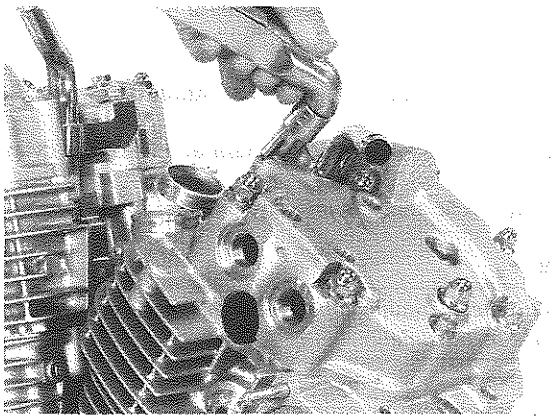
NOTE

- Both intake rocker arm shafts should fall within the same limits.



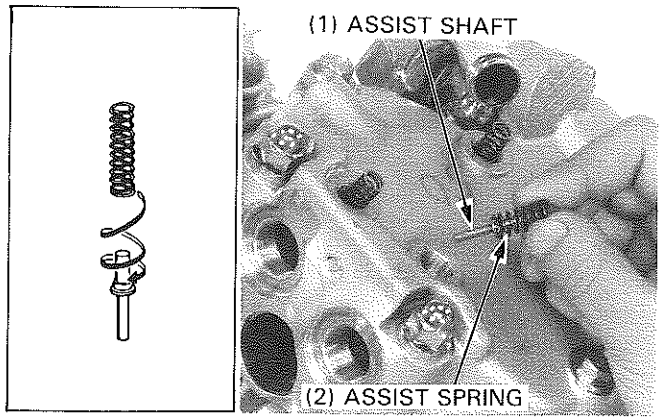
Install and tighten the cylinder head cover bolts and cap nuts in crisscross pattern in 2–3 steps.

TORQUE:
10 mm cap nut: 38–42 N·m (3.8–4.2 kg-m, 27–30 ft-lb)
8 mm cap nut: 25–29 N·m (2.5–2.9 kg-m, 18–21 ft-lb)



Install the assist spring onto the assist shaft while twisting it so that the assist spring end seats the shaft flange face tightly.

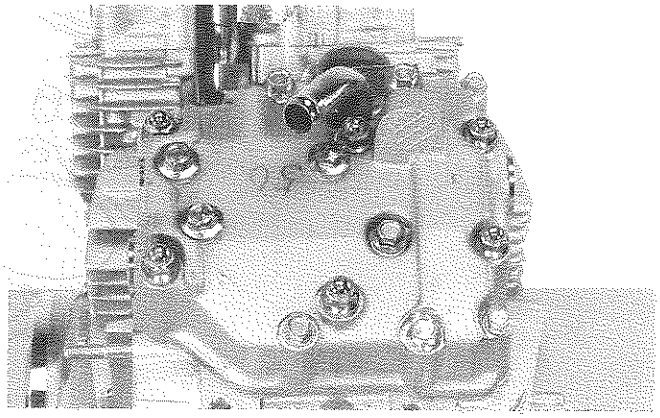
Install the assist shafts and springs to the cylinder head.



Place a new O-ring on each assist shaft cap and install and tighten them.

TORQUE: 20—24 N·m (2.0—2.4 kg-m, 15—17 ft-lb)

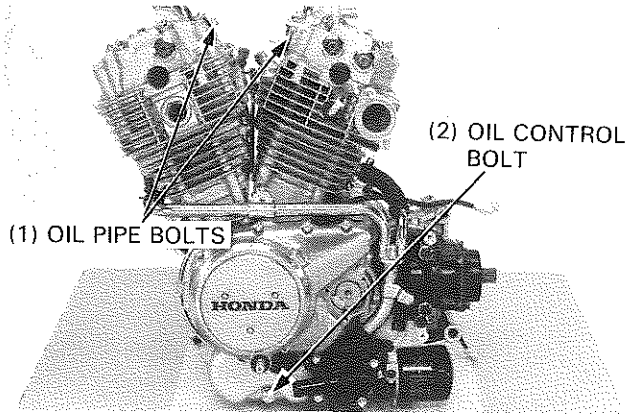
Place a new O-ring on each rocker arm shaft plug and install and tighten the plug.

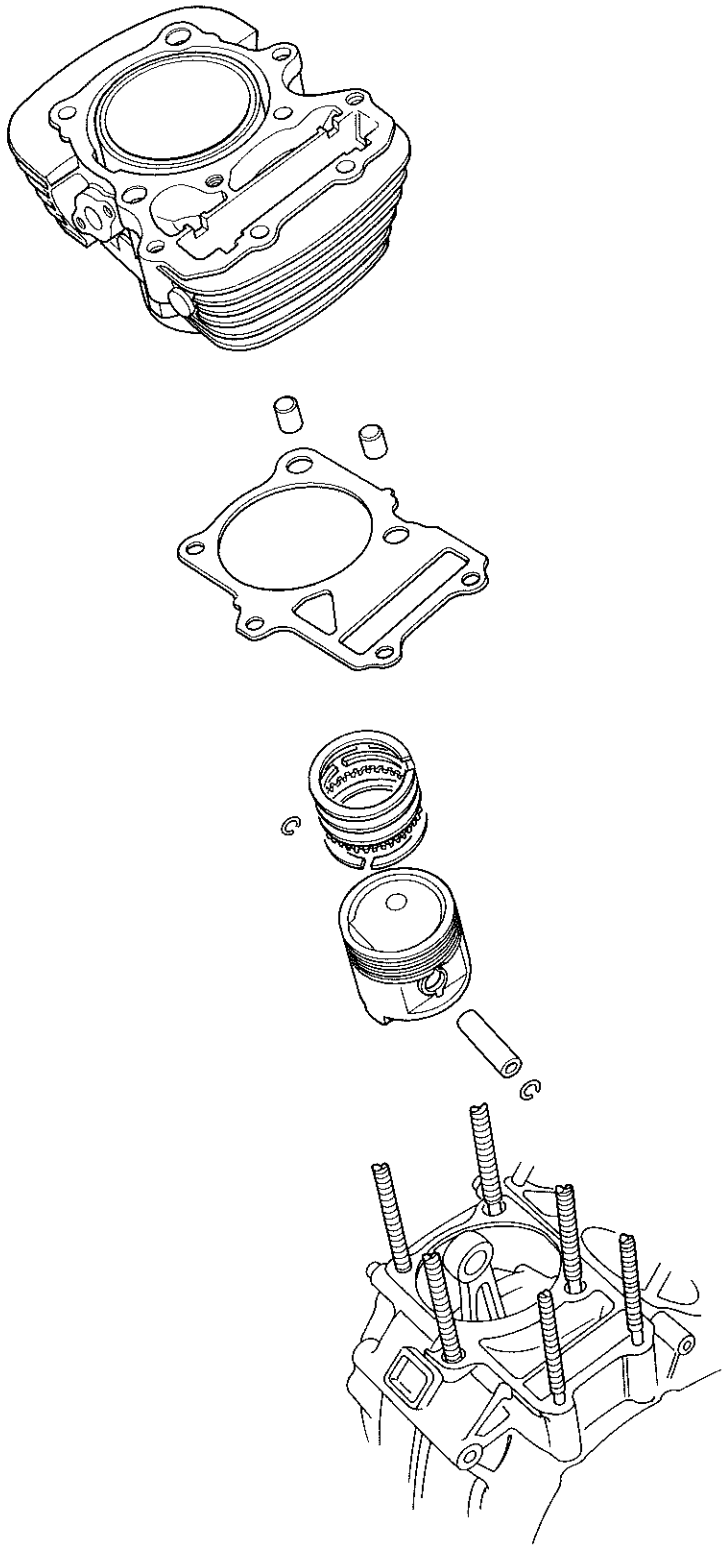


Install the oil pipe and tighten the bolts.

TORQUE:
oil control bolt:
20—25 N·m (2.0—2.5 kg-m, 15—18 ft-lb)
oil pipe bolt:
10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

Install the water hoses and pipes.





11. CYLINDER/PISTON

SERVICE INFORMATION

GENERAL

- To service the cylinder/piston, the engine must be removed from the frame (see section 5).
- Cylinder head coolant is fed through water jackets in the cylinder.
- Be sure that the water pipe O-ring, gasket and dowel pins are in place before installing the cylinder head.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Cylinder	I.D.		76.500—76.515 (3.0118—3.0124)	76.545 (3.0136)
	Out-of-round		—	0.05 (0.002)
	Taper		—	0.05 (0.002)
	Warpage		—	0.05 (0.002)
Piston, piston ring and piston pin	Piston O.D.		76.46—76.49 (3.0102—3.0114)	76.41 (3.0083)
	Piston pin hole I.D.		22.002—22.008 (0.8662—0.8665)	22.018 (0.8668)
	Piston pin O.D.		21.994—22.000 (0.8659—0.8661)	21.984(0.8655)
	Piston pin-to-piston clearance		0.002—0.014 (0.0001—0.0006)	0.034 (0.0013)
	Piston ring-to-groove clearance	Top/second	0.015—0.045 (0.0006—0.0018)	0.25 (0.010)
		Oil	0.030—0.035 (0.0012—0.0014)	0.10 (0.004)
	Piston ring end gap	Top/second	0.20—0.35 (0.008—0.014)	0.50 (0.020)
		Oil (side rail)	0.30—0.90 (0.012—0.035)	1.1 (0.04)
Piston-to-cylinder clearance			0.010—0.045 (0.0004—0.0018)	0.32 (0.013)
Connecting rod small end I.D.			20.020—20.041 (0.7882—0.7890)	22.051 (0.8681)
Connecting rod to piston pin clearance			0.020—0.047 (0.0008—0.0019)	0.067 (0.0026)

TROUBLESHOOTING

Low or uneven compression
- Worn cylinder or piston rings
- Leaking head gasket
- Incorrect valve timing

Excessive smoke
- Worn cylinder and piston rings
- Improperly installed piston rings
- Damaged piston or cylinder

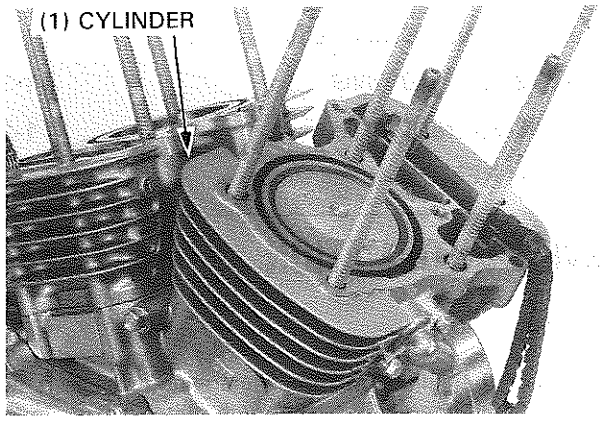
Overheating
- Excessive carbon deposits on piston or in combustion chamber
- Faulty water pump

Piston noise
- Worn cylinder and piston
- Excessive carbon deposits

CYLINDER REMOVAL

Remove the cylinder head (section 10).
Remove the cylinder.

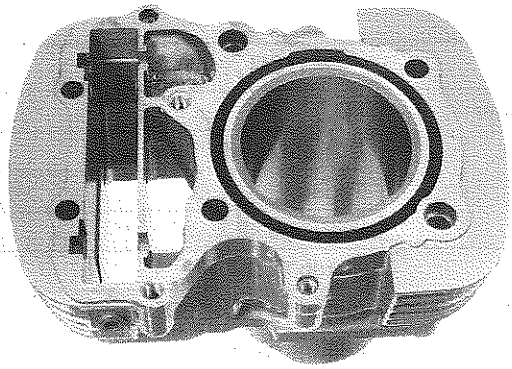
Remove the gasket and dowel pins.



Clean the top of each cylinder thoroughly.

NOTE

- Avoid damaging the gasket surface.



CYLINDER INSPECTION

Inspect the cylinder walls for scratches and wear.
Measure and record the cylinder inside diameter at the three levels in both an X and Y axis. Take the maximum reading to determine the cylinder wear.

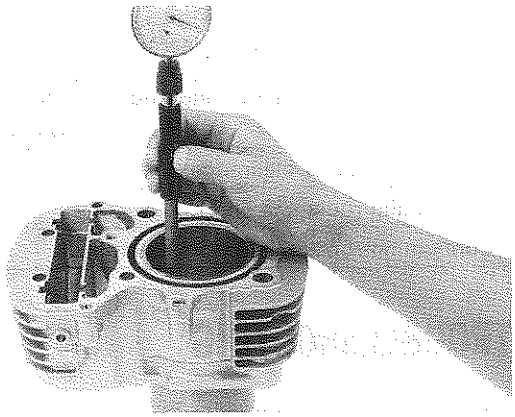
SERVICE LIMIT: 76.545 mm (3.0136 in)

Calculate the piston-to-cylinder clearnce. Take the maximum reading to determine the clearance.

SERVICE LIMIT: 0.05 mm (0.002 in)

Calculate the cylinder for taper at three levels in an X and Y axis. Take the maximum reading to determine the taper.

SERVICE LIMIT: 0.05 mm (0.002 in)



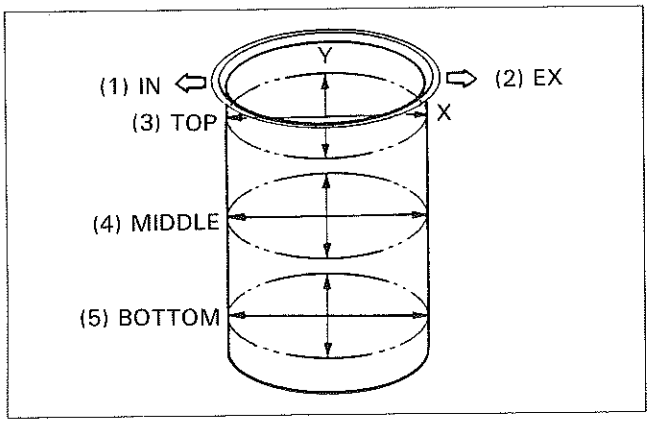
Calculate the cylinder for out-of-round at three levels in an X and Y axis. Take the maximum reading to determine the out-of-round.

SERVICE LIMIT: 0.05 mm (0.002 in)

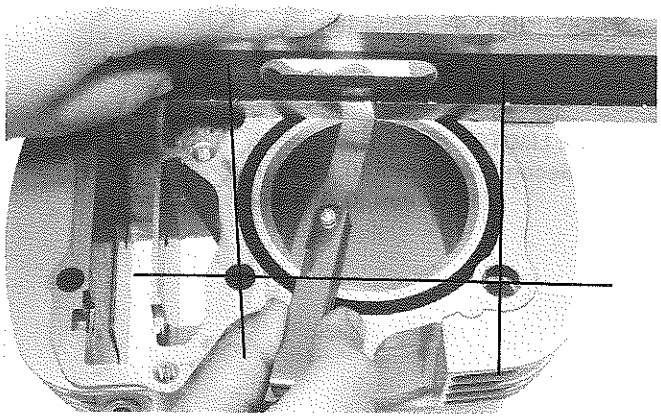
The cylinder must be rebored and oversize piston fitted if the service limits are exceeded.

The following oversize pistons are available:
0.25 mm (0.010 in) and 0.50 mm (0.020 in)

The cylinder must be rebored so that the clearance to an oversize piston is 0.010—0.045 mm (0.0004—0.0018 in).



Inspect the cylinder for transverse warpage across the top.



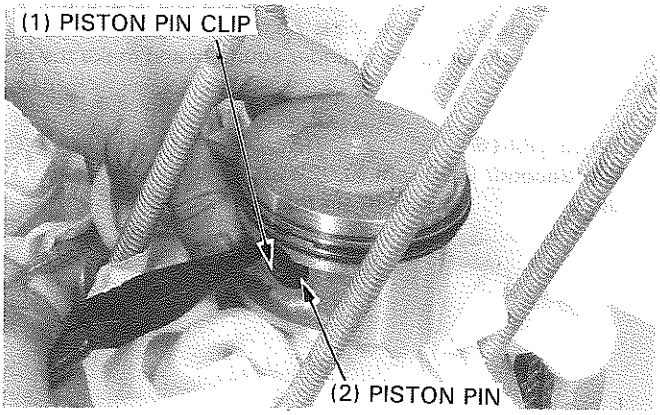
NOTE

- Measure warpage using a straight edge and feeler gauge in the directions shown.

SERVICE LIMIT: 0.05 mm (0.002 in)

PISTON REMOVAL

Place a shop towel into the crankcase and remove the piston pin clips.

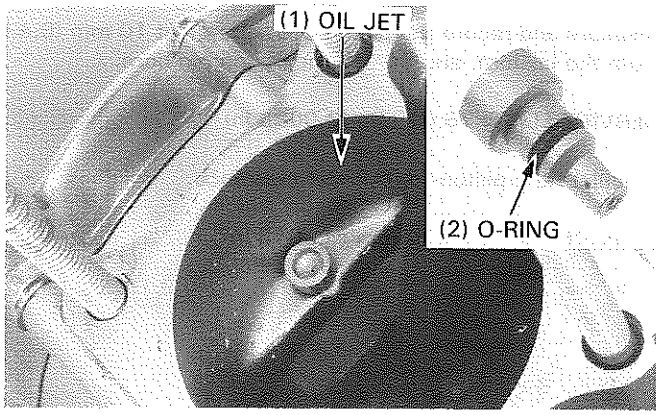


NOTE

- Do not let the clips fall into the crankcase.

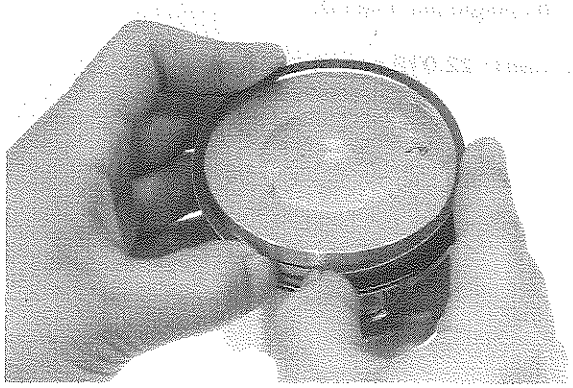
Push the piston pin out and remove the piston.

Remove the oil jet and check for clogging.
Remove the O-ring from the oil jet.



Remove the piston rings and mark them to indicate the correct cylinder and piston position for reassembly.

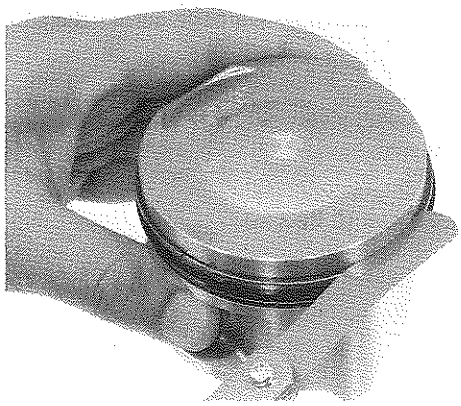
Inspect the piston for cracks or other damage and the ring grooves for excessive wear or carbon build-up.



NOTE

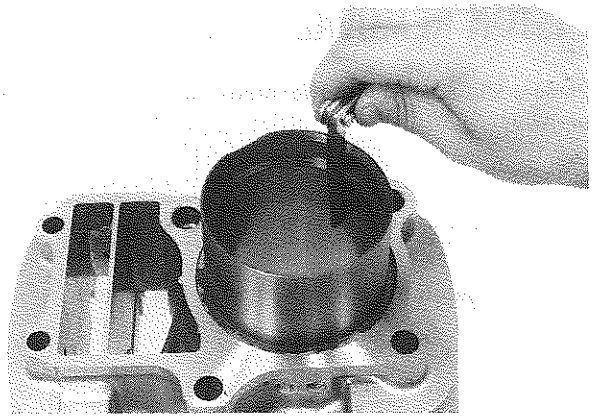
- Use care when removing the rings.

PISTON/PISTON RING INSPECTION



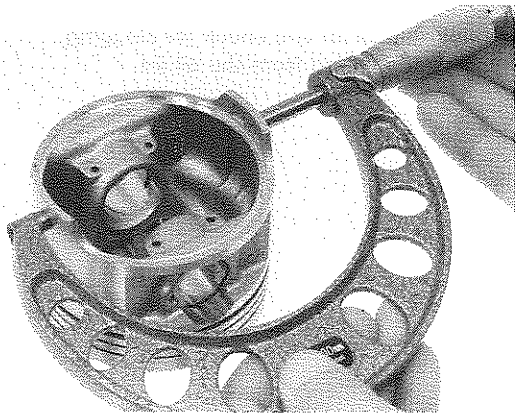
Measure the piston ring-to-groove clearance.

SERVICE LIMITS:
Top/Second: 0.25 mm (0.010 in)
Oil: 0.10 mm (0.004 in)



Measure the top and second piston ring end gaps; using a piston, push the ring into the cylinder squarely and make the measurement.

SERVICE LIMITS:
Top/Second: 0.50 mm (0.020 in)
Oil: 1.1 mm (0.04 in)

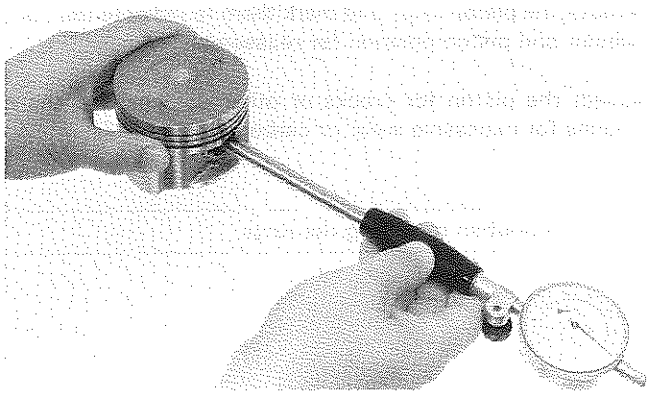


Measure and record the piston O.D. at a point 10 mm (0.4 in) from the bottom, and 90° to the piston pin bore.

SERVICE LIMIT: 76.41 mm (3.0083 in)

Calculate the piston-to -cylinder clearance.

SERVICE LIMIT: 0.034 mm (0.0013 in)



Measure the piston pin hole I.D.

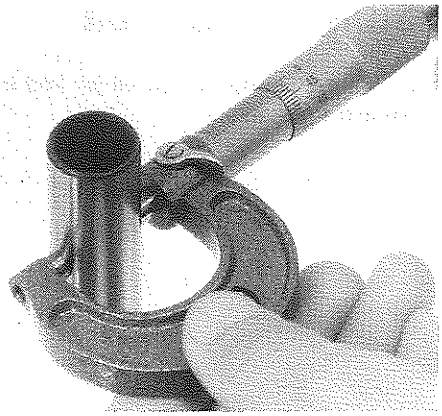
SERVICE LIMIT: 22.018 mm (0.8668 in)

Measure the piston pin O.D.

SERVICE LIMIT: 21.984 mm (0.8655 in)

Calculate the piston pin-to-piston clearance.

SERVICE LIMIT: 0.034 mm (0.0013 in)



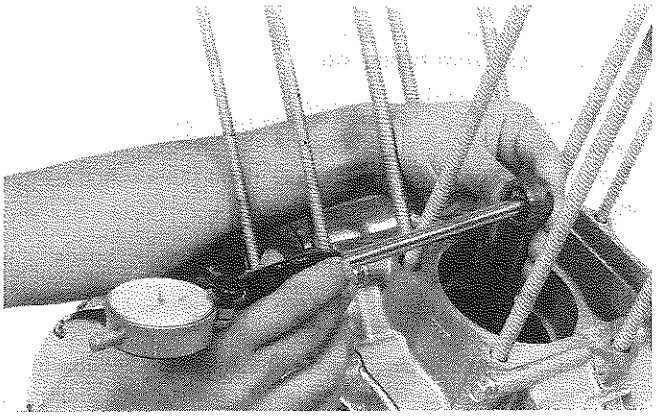
Measure the connecting rod small end ID.

SERVICE LIMIT: 22.051 mm (0.8681 in)

Calculate the connecting rod-to-piston pin clearance.

SERVICE LIMIT: 0.067 mm (0.0026 in)

Refer to page 13-6 for connecting rod replacement.



PISTON RING INSTALLATION

Clean the piston domes, ring lands, and skirts.

NOTE

- Insert the outside surface of the ring into the proper ring groove and roll around in the groove to make sure that the ring has a free fit around the piston's circumference.

Carefully install the piston rings onto the piston with the markings facing up.

NOTE

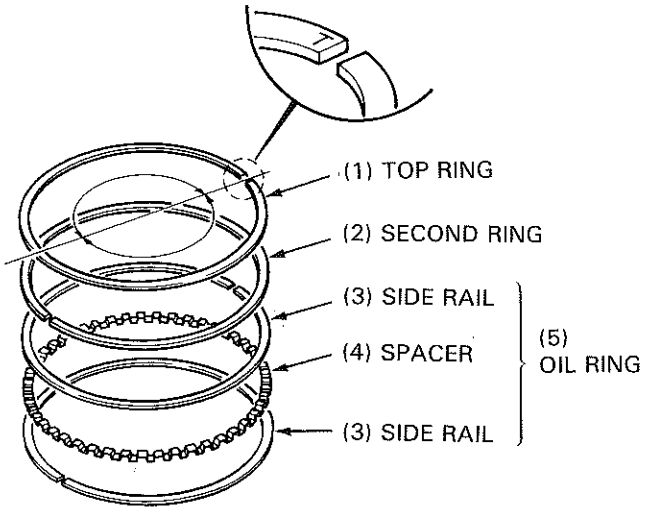
- Be careful not to damage the piston and piston rings during assembly.

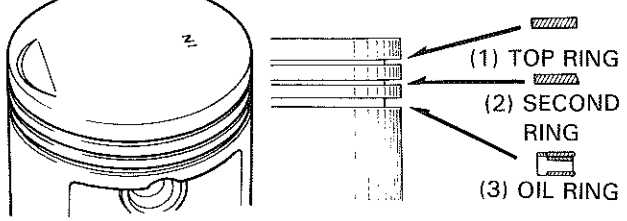
Stagger the ring end gaps 180° apart as shown.

NOTE

- To install the oil ring, install the spacer first, then install the side rails.

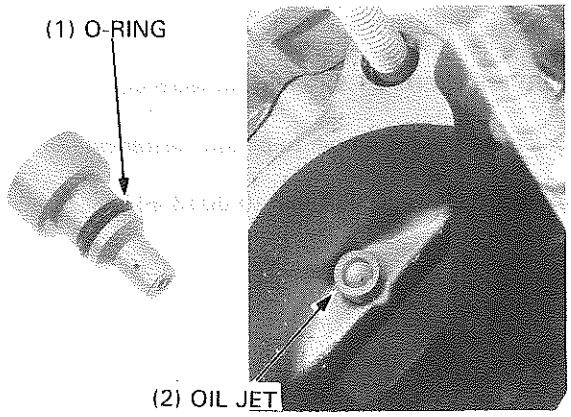
After installing the rings, check that they rotate freely without sticking.





PISTON INSTALLATION

Install a new O-ring on the oil jet and install the jet into the crankcase as shown.



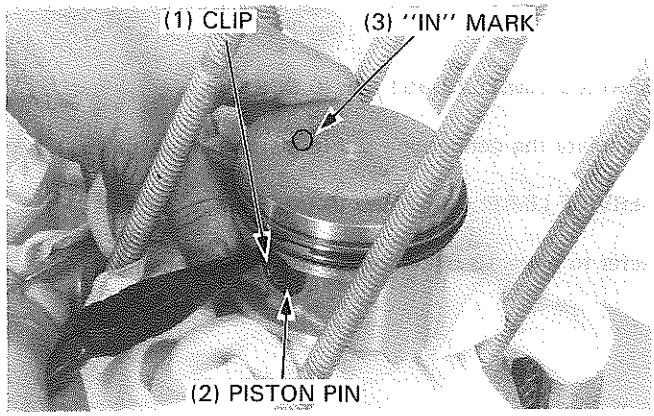
Place a shop towel over the crankcase opening to prevent piston pin clips from falling into the crankcase.

Coat the connecting rod small end with molybdenum disulfide grease.
Install the piston with the ''IN'' mark facing towards the intake side.

Install new piston pin clips.

NOTE

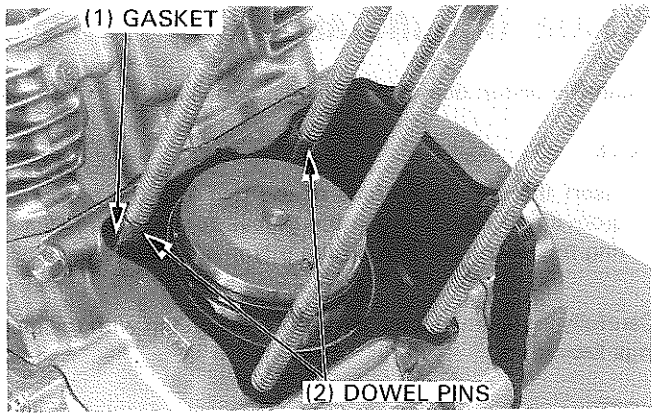
- Make sure that the piston pin clips are seated properly and their end gaps are not aligned with the cutout in the piston.



CYLINDER INSTALLATION

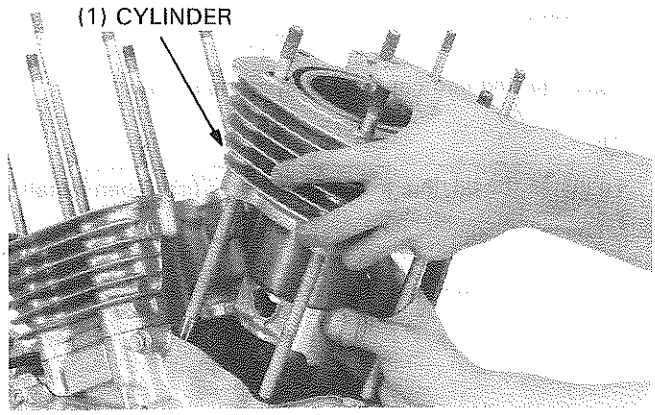
Clean the gasket surface of the crankcase thoroughly with the scraper, being careful not to damage it.

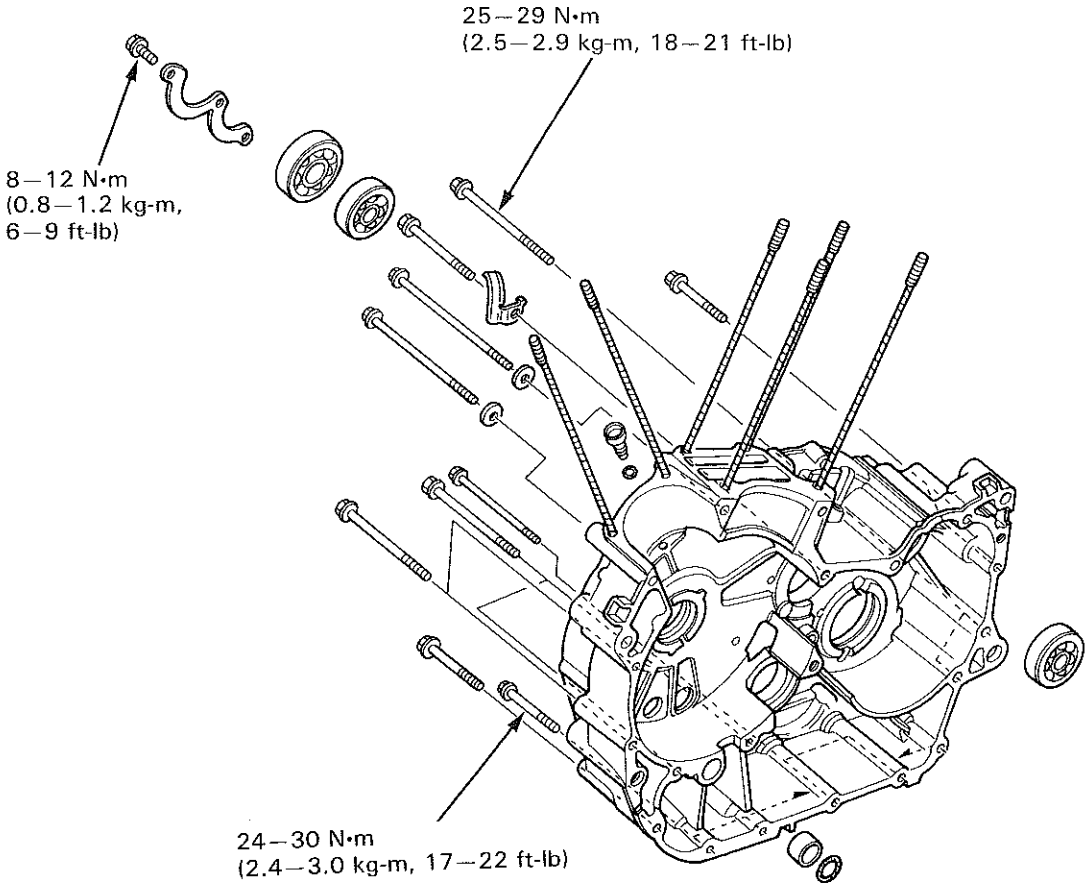
Install a new gasket and the dowel pins.

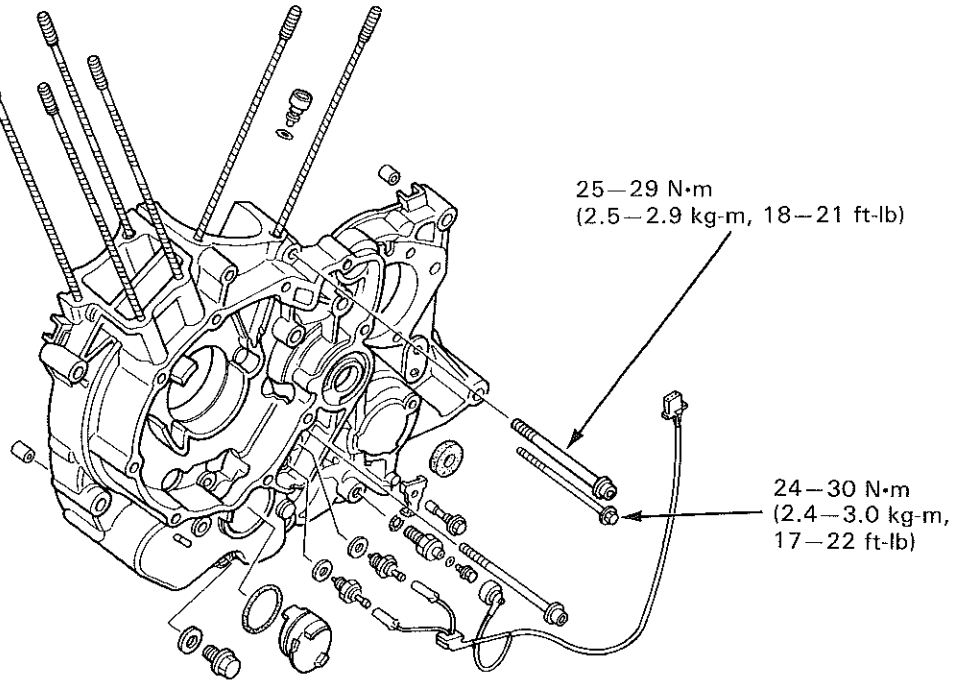


Coat the cyllinder, piston rings/grooves and piston with clean engine oil.
Install the cylinder over the piston while compressing the piston rings with your fingers, being careful not to damage the piston rings and cylinder wall.

Install the cylinder head (section 10).




25—29 N•m
(2.5—2.9 kg-m, 18—21 ft-lb)
8—12 N•m
(0.8—1.2 kg-m,
6—9 ft-lb)
24—30 N•m
(2.4—3.0 kg-m, 17—22 ft-lb)


25—29 N•m
(2.5—2.9 kg-m, 18—21 ft-lb)
24—30 N•m
(2.4—3.0 kg-m,
17—22 ft-lb)

SERVICE INFORMATION

- To service the connecting rods, crankshaft, transmission and output gear, the crankcase must be separated.
- The following parts must be removed before disassembling the crankcase:
  - Oil pump (section 2)
  - Water pump (section 6)
  - Clutch and primary drive gear (section 7)
  - Flywheel and starter clutch (section 8)
  - Gearshift linkage (section 9)
  - Cylinder heads (section 10)
  - Cylinder and piston (section 11)
  - Starter motor (section 20)

TORQUE VALUES

Crankcase bolt	8 mm	25—29 N·m (2.5—2.9 kg-m, 18—21 ft-lb)
	6 mm	24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)
Final drive shaft bolt		45—55 N·m (4.5—5.5 kg-m, 33—40 ft-lb)
Bearing set plate	bolt	8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb) Apply a locking agent
	screw	7—11 N·m (0.7—1.1 kg-m, 5—8 ft-lb) Apply a locking agent

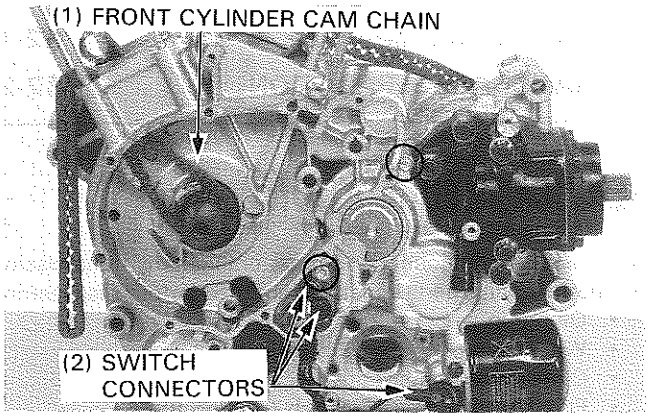
TOOL

Special

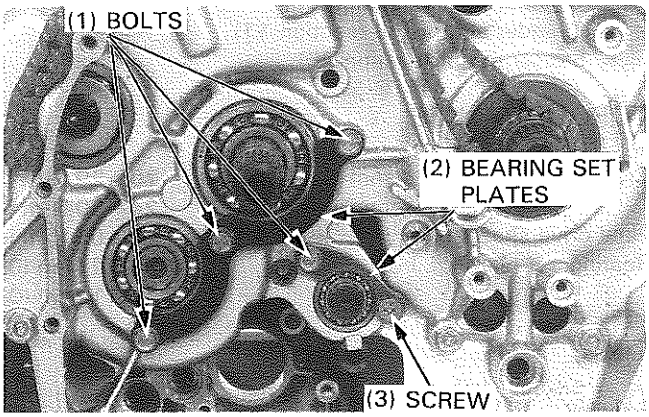
Shaft holder	07923—6890101

CRANKCASE SEPARATION

Refer to Service Information (page 12-1) for removal of necessary parts before disassembling the crankcase.
Remove the front cylinder cam chain.
Disconnect the neutral, over drive and oil pressure switch wire connectors.
Remove the bolts from the left crankcase.

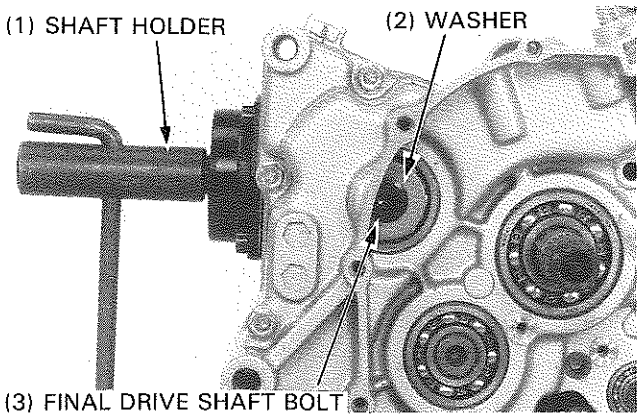


Remove the bearing set plates if the bearings are to be replaced.
Remove the rear cylinder cam chain.

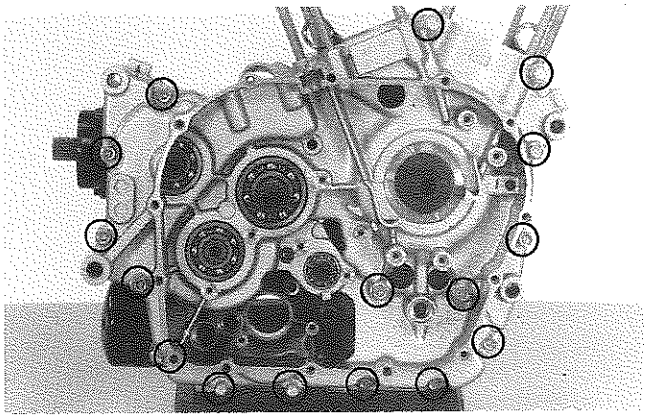


Hold the final driven shaft with a shaft holder and remove the final drive shaft bolt and washer.

TOOL:
Shaft holder **07923—6890101**

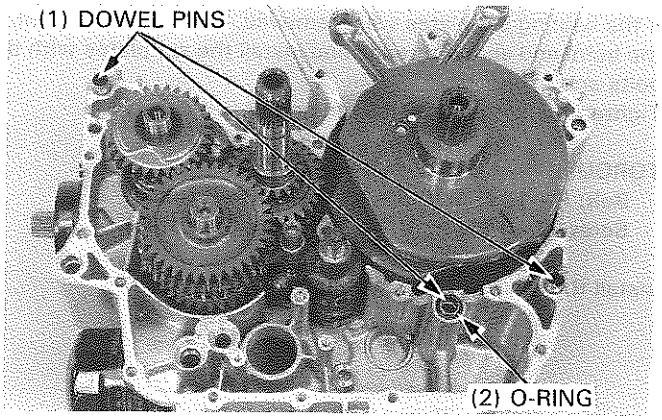


Loosen the right crankcase 6 mm and 8 mm bolts in a crisscross pattern in 2—3 steps, and remove the bolts.
Place the crankcase with the left side down.
Separate the right crankcase from the left crankcase



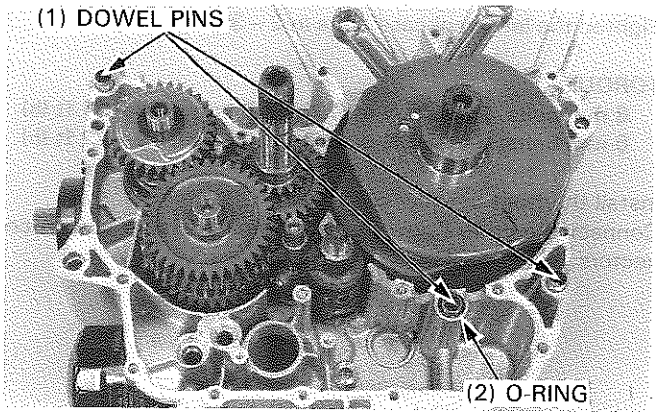
Remove the dowel pins and O-ring.

Remove the following parts:
- Crankshaft/connecting rod (section 13).
- Shift forks/shift drum (section 13).
- Transmission (section 13).
- Output gear assembly (section 13).



CRANKCASE ASSEMBLY

Clean the left and right crankcase mating surface thoroughly, being careful not to damage them.
Install the output gear assembly to the left crankcase (page 13-30).
Install the crankshaft, transmission, shift forks and drum (section 13).
Install the thrust washer and final driven gear in the right crankcase.
Apply liquid sealant to the crankcase mating surface.
Install the dowel pins and a new O-ring.
Install the right crankcase over the left crankcase.

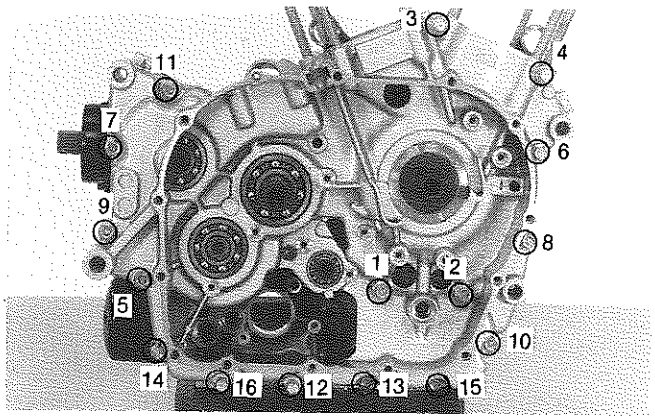


Tighten the right crankcase bolts in the sequence shown in 2—3 steps.

TORQUE:
8 mm bolts: 25—29 N·m (2.5—2.9 Kg-m, 18—21 ft-lb)
6 mm bolts: 24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)

NOTE

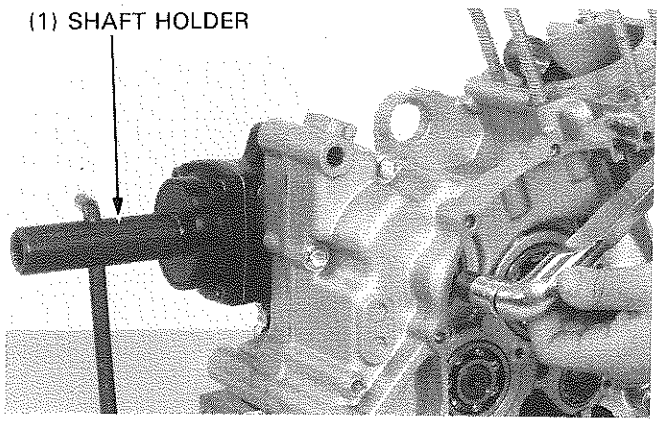
- Bolts 1 through 11 are 8 mm.



Hold the final driven shaft with the shaft holder, install the washer and final shaft bolt and tighten the bolt.

TORQUE: 45—55 N·m (4.5—5.5 kg-m, 33—40 ft-lb)

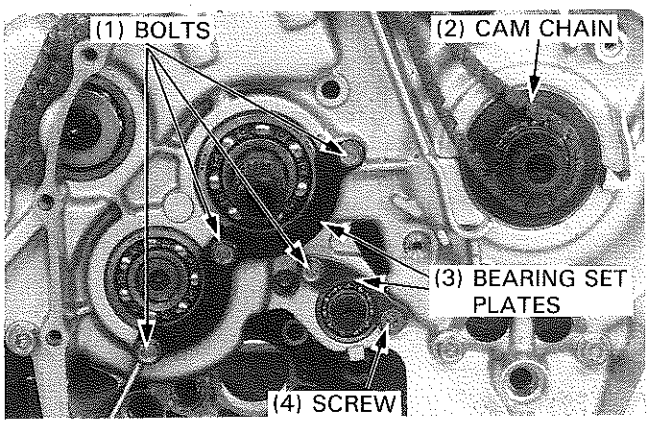
TOOL:
Shaft Holder **07923—6890101**



If the bearing set plates were removed, apply locking agent to the bolts and screw threads and install the set plates with the bolts and screw.
Tighten the set plate bolts and screw.

TORQUE:
Bolt: 8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
Screw:7—11 N·m (0.7—1.1 kg-m, 5—8 ft-lb)

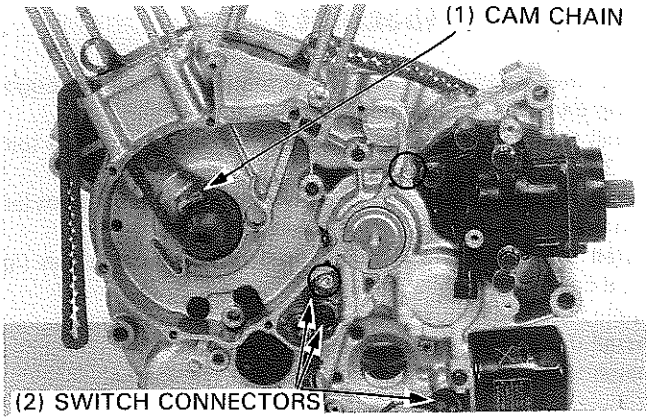
Install the rear cylinder cam chain.

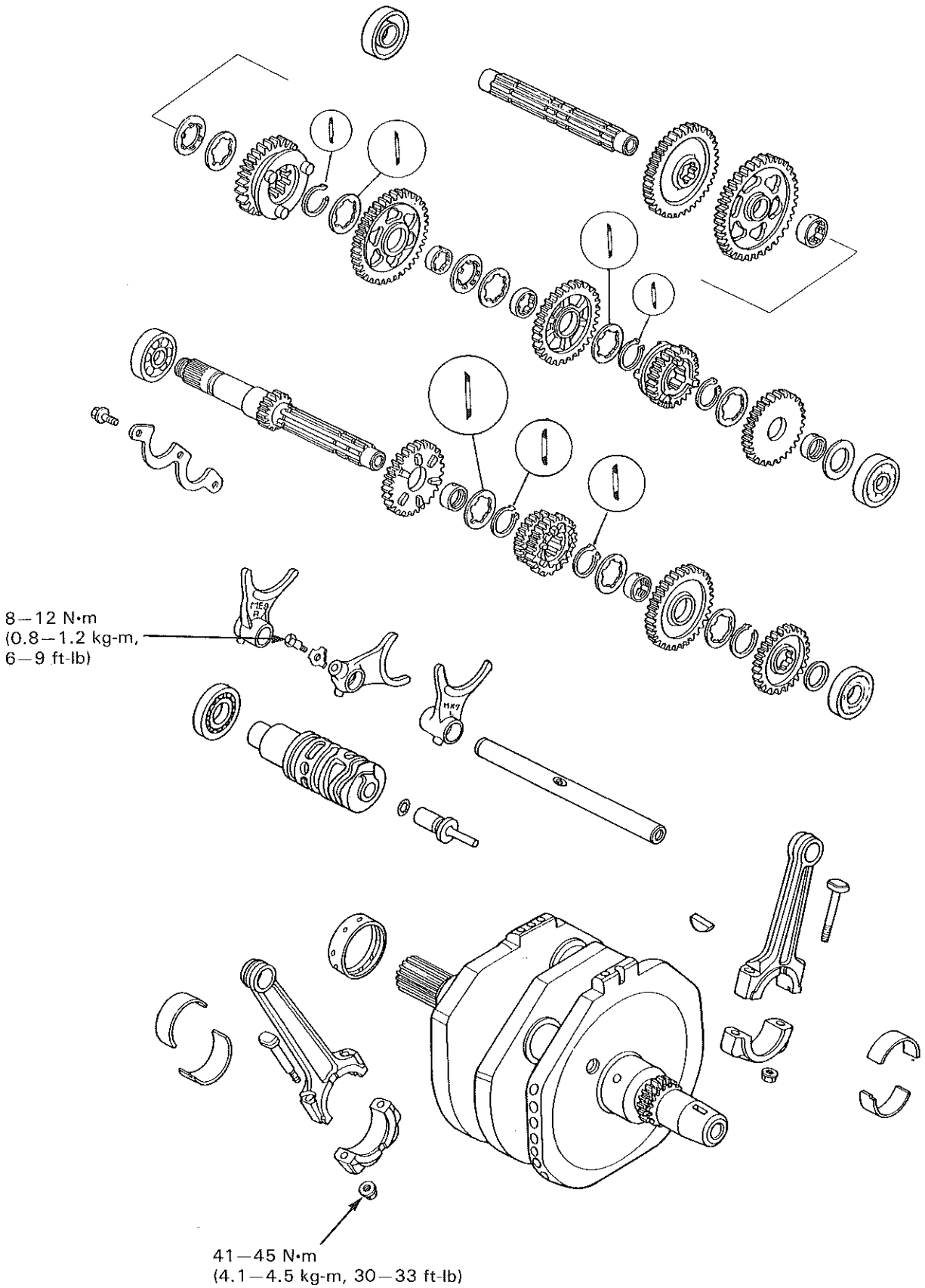


Tighten the left crankcase bolts in 2—3 steps.

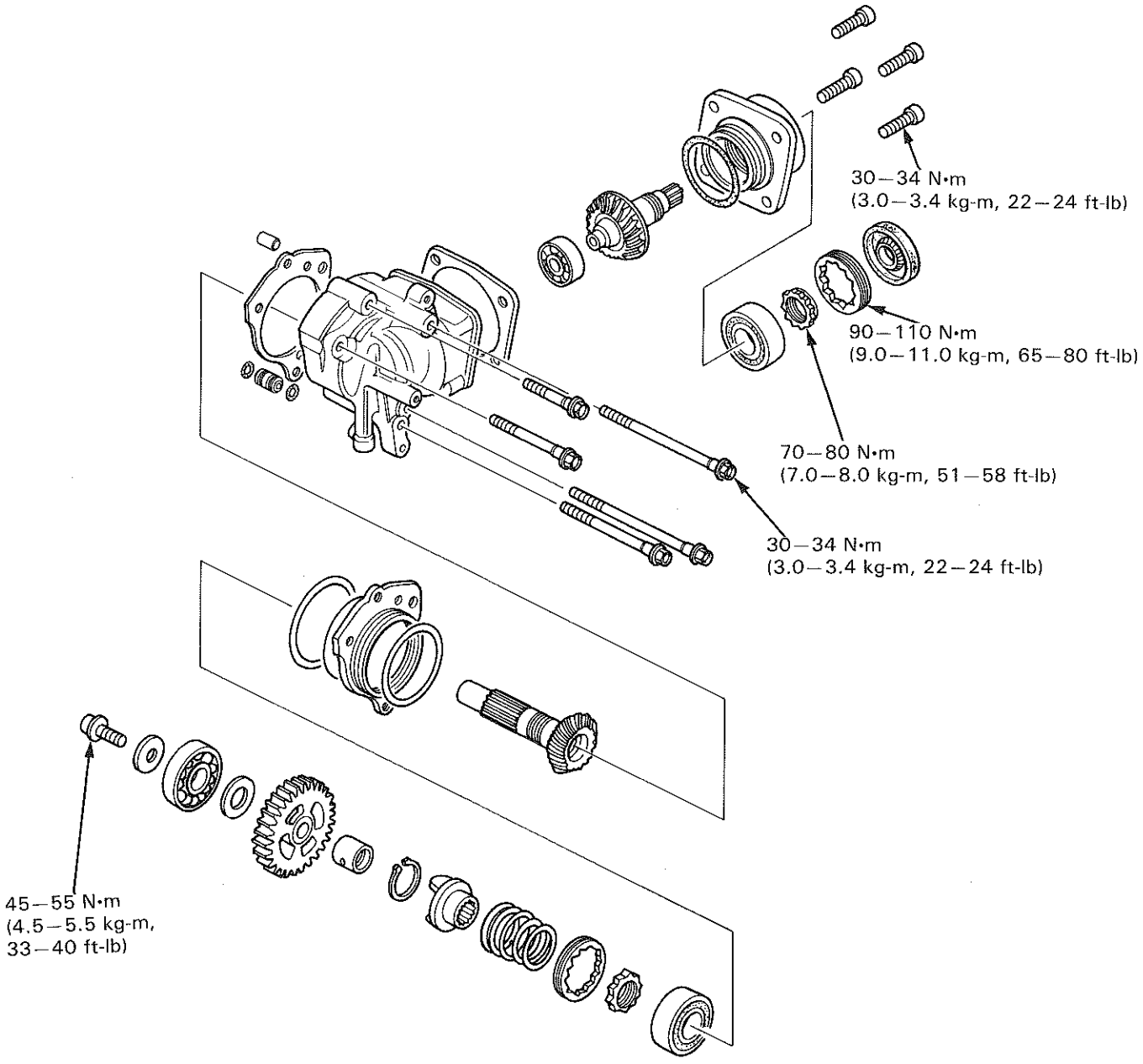
TORQUE:
8 mm bolts: 25—29 N·m (2.5—2.9 kg-m, 18—21 ft-lb)
6 mm bolts: 24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)

Install the front cylinder cam chain.
Connect the neutral, over drive and oil pressure switch connectors.




8—12 N·m
(0.8—1.2 kg-m,
6—9 ft-lb)
41—45 N·m
(4.1—4.5 kg-m, 30—33 ft-lb)

13. CRANKSHAFT/TRANSMISSION



SERVICE INFORMATION

GENERAL

- For crankshaft and transmission repair, the crankcase must be separated (Section 12).
- All bearing inserts are select fitted and are identified by color code. Select replacement bearings from the code tables. After installing new bearings, recheck them with plastigauge to verify clearance.
- Apply molybdenum disulfide grease to the main journals and crankpins during assembly.
- When replacing the following output gear components, a new adjustment shim must be selected.
  - Output gear case.
  - Output gear assembly.
  - Output gear bearing.
  - Output gear bearing holder.
- Replace the final drive and output drive shafts as a set.
- When using the lock nut wrench, use a deflecting beam type torque wrench 20 inches long. The lock nut wrench increases, the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut. The specification given on the next page is the actual torque applied to the lock nut, not the reading on the torque wrench when used with the lock nut wrench. The procedure later in the text gives both actual and indicated.

SPECIFICATIONS

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Crankshaft/ connecting rod	Connecting rod big end side clearance		0.10—0.25 (0.0039—0.010)	0.40 (0.0157)
	Connecting rod small end I.D.		20.020—20.041 (0.7882—0.7890)	20.09 (0.7909)
	Crankpin oil clearance		0.028—0.052 (0.0011—0.0020)	0.07 (0.0028)
	Main journal oil clearance		0.025—0.041 (0.0010—0.0016)	0.06 (0.0024)
	Crankshaft runout		—	0.05 (0.0020)
Countershaft	Backlash	Low	0.089—0.170 (0.0035—0.0067)	0.24 (0.0094)
		2nd, 3rd, 4th, 5th and 6th gears	0.068—0.136 (0.0027—0.0054)	0.18 (0.0071)
	Gear I.D.	M5, M6, C1, C2, C3	28.000—28.021 (1.1023—1.1032)	28.04 (1.1039)
		C4	29.000—29.021 (1.1417—1.1426)	29.04 (1.1433)
	Gear bushing O.D.	M5, M6, C1, C2, C3	27.959—27.980 (1.1007—1.1016)	27.94 (1.1000)
		C4	28.959—28.980 (1.1401—1.1410)	28.94 (1.1394)
	Gear bushing I.D.	M5, C4	24.985—25.006 (0.9837—0.9845)	25.04 (0.9858)
	Mainshaft O.D.	M5	24.959—24.980 (0.9826—0.9835)	24.90 (0.9803)
	Countershaft O.D.	C4	24.959—24.980 (0.9826—0.9835)	24.90 (0.9803)
	Gear-to-bushing or shaft clearance	M5, 6 gear to bushing	0.020—0.060 (0.0008—0.0024)	0.10 (0.004)
		M5 bushing to shaft	0.005—0.047 (0.0002—0.0019)	0.06 (0.0024)
		C1, 2, 3, 4 gear to bushing	0.020—0.062 (0.0008—0.0024)	0.10 (0.004)
		C4 gear to bushing	0.005—0.047 (0.0002—0.0019)	0.06 (0.0024)

Unit: mm (in)

ITEM			STANDARD	SERVICE LIMIT
Output gear	Backlash	Final drive gear	0.08—0.023 (0.0031—0.0091)	0.40 (0.0157)
	Damper shaft gear	Gear I.D.	24.000—24.021 (0.9449—0.9457)	24.10 (0.9488)
		Bushing O.D.	23.959—23.980 (0.9433—0.9441)	23.70 (0.9331)
		Bushing I.D.	20.020—20.041 (0.7882—0.7890)	20.10 (0.7913)
	Final drive shaft O.D.		19.979—20.000 (0.7866—0.7874)	19.970 (0.7862)
	Damper spring free length		63.9 (2.5157)	62.5 (2.4606)
Shift fork/fork shaft	Claw thickness		6.50—6.57 (0.2559—0.2587)	6.20 (0.2441)
	Right and left shift fork I.D.		14.000—14.021 (0.5512—0.5520)	14.04 (0.5528)
	Shaft O.D.		13.966—13.984 (0.5498—0.5506)	13.90 (0.5472)
Shift drum	Shift drum I.D.		12.500—12.518 (0.4921—0.4928)	12.54 (0.4937)
	Shift drum holder O.D.		12.457—12.484 (0.4904—0.4915)	12.33 (0.4854)

TORQUE VALUES

Connecting rod nut		41—45 N·m (4.1—4.5 kg-m, 30—33 ft-lb)
Final drive shaft bolt		45—55 N·m (4.5—5.5 kg-m, 33—40 ft-lb)
Output gear case bolt		30—34 N·m (3.0—3.4 kg-m, 22—24 ft-lb)
Output gear bearing lock nut	(Inner)	70—80 N·m (7.0—8.0 kg-m, 51—58 ft-lb)
	(Outer)	90—110 N·m (9.0—11.0 kg-m, 65—80 ft-lb)
Shift fork		8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
Final drive shaft bearing lock nut	(Inner)	70—80 N·m (7.0—8.0 kg-m, 51—58 ft-lb)
	(Outer)	90—110 N·m (9.0—11.0 kg-m, 65—80 ft-lb)
Final drive shaft bearing holder bolt		30—34 N·m (3.0—3.4 kg-m, 22—24 ft-lb)

TOOLS

Special

Main bearing remover attachment	07946—ME90100
Main bearing driver attachment	07946—ME90200
Damper spring compressor	07964—ME90000 Not available in U.S.A.
assembly bolt	07965—1660200 ┐ U.S.A. only
assembly collar	07965—1660300 ├
compressor seat	07967—9690200 ├
threaded adaptor	07965—KA30000 ┘
Snap ring pliers	07914—S670100 or equivalent commercially available in U.S.A.
Lock nut wrench, 30 x 64 mm	07916—MB00001
Dis/Assembly tool	07965—3710101
Shaft holder	07923—6890101
Bearing remover, 17 mm	07936—3710300
Remover handle	07936—3710100
Remover weight	07741—0010201 or 07936—3710200
Bearing remover set, 20 mm	07936—3710001 Not available in U.S.A.
— bearing remover, 20 mm	07936—3710600
— remover handle	07936—3710100
— remover weight	07741—0010201 or 07936—3710200

Common

Attachment, 32 x 35 mm	07746—0010100
Attachment, 42 x 47 mm	07746—0010300
Attachment, 52 x 55 mm	07746—0010400
Attachment, 62 x 68 mm	07746—0010500
Pilot, 17 mm	07746—0040400
Pilot, 20 mm	07746—0040500
Pilot, 25 mm	07746—0041100
Pilot, 30 mm	07746—0040700
Driver	07749—0010000
Attachment, 30 mm I.D.	07746—0030300
Driver inner	07746—0030100

TROUBLESHOOTING

Excessive noise
- Crankshaft
  - — Worn main bearing
  - — Worn rod bearing
- Connecting rod
  - — Worn rod small end

Hard to shift
- Air in clutch system
- Shift fork bent
- Shift fork shaft bent
- Shift spindle claw bent
- Shift drum cam grooves damaged
- Shift fork guide pin damaged

Transmission jumps out of gear
- Gear dogs worn
- Shift shaft bent
- Shift shaft stopper broken
- Shift forks bent

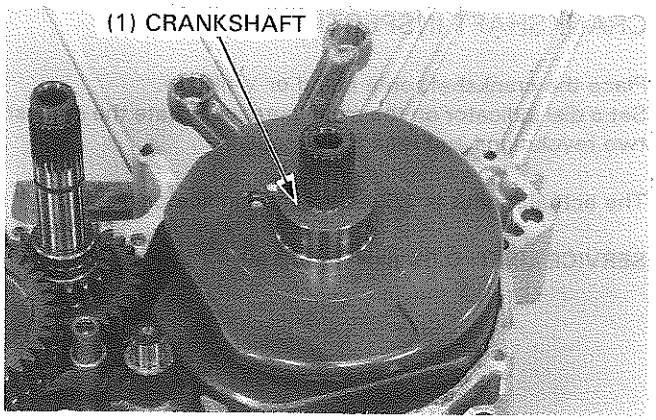
Excessive output gear noise
- Output drive and driven gears worn or damaged
- Bearings worn or damaged
- Excessive backlash between output drive and driven gears
- Improper shim thickness

CRANKSHAFT/CONNECTING ROD

CRANKSHAFT REMOVAL

Separate the crankcase (page 12-2) and remove the dowel pins and O-ring.

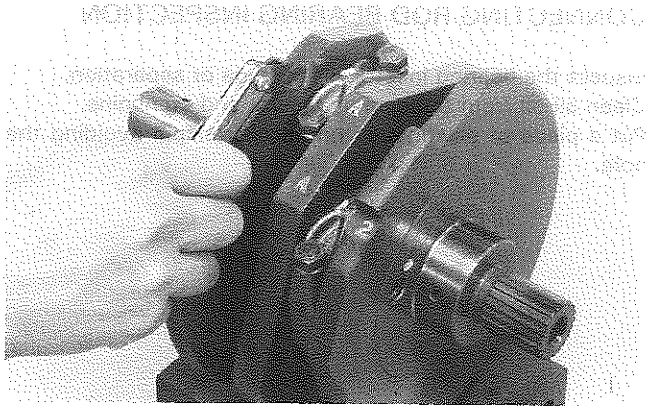
Remove the crankshaft.



INSPECTION

Check the connecting rod side clearance.

SERVICE LIMIT: 0.40 mm (0.0157 in)

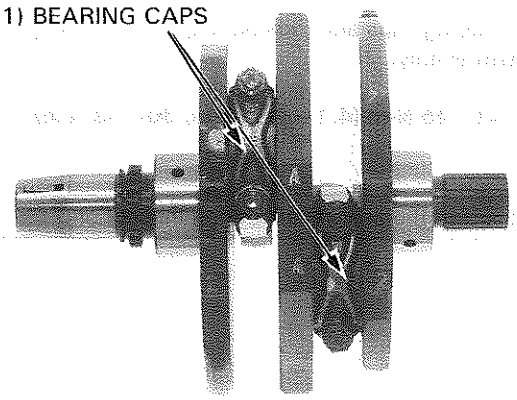


CONNECTING ROD REMOVAL

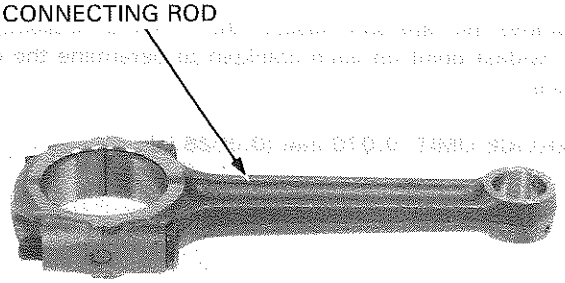
Remove the connecting rod bearing caps noting their locations.

NOTE

- Tap the side of the cap lightly if it is hard to remove.



Mark the rods, bearings and caps as you remove them to indicate the correct cylinder and position on the crankpins for reassembly.

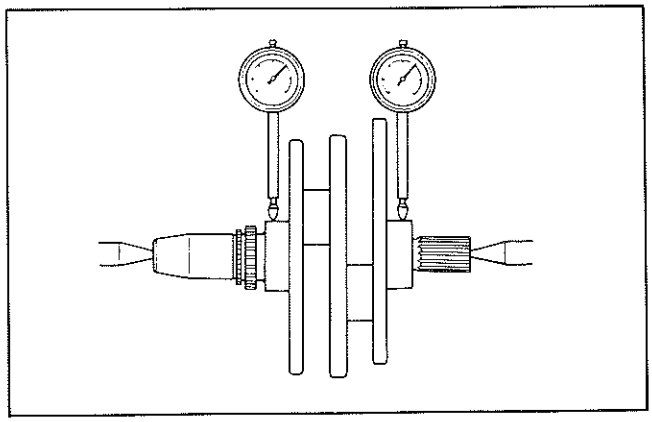


CRANKSHAFT INSPECTION

Place the crankshaft on a stand or V blocks.
Set a dial indicator on the main journals. Rotate the crankshaft two revolutions and read the runout.

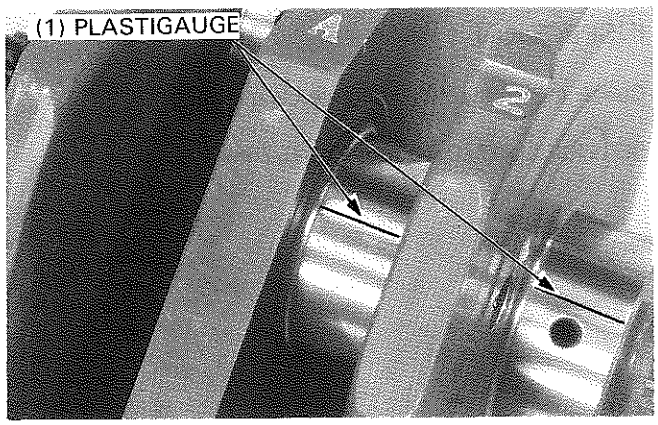
The actual runout is 1/2 of the total indicator reading.

SERVICE LIMIT: 0.05 mm (0.002 in)



CONNECTING ROD BEARING INSPECTION

Inspect the bearing inserts for damage or separation.
Clean all oil from the bearing inserts and crankpins.
Put a piece of plastigauge on each crankpin avoiding the oil hole.

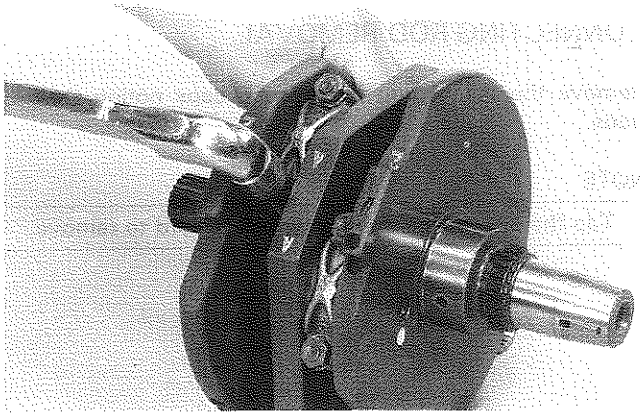


Install the bearing caps and rods on the correct crankpins, and tighten them evenly.

TORQUE: 41—45 N·m (4.1—4.5 kg-m, 30—33 ft-lb)

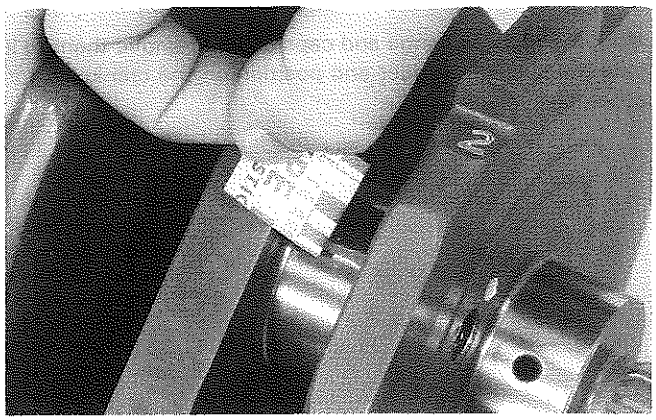
NOTE

- Do not rotate the crankshaft during inspection.



Remove the caps and measure the compressed plastigauge at its widest point on each crankpin to determine the oil clearance.

SERVICE LIMIT: 0.070 mm (0.0028 in)



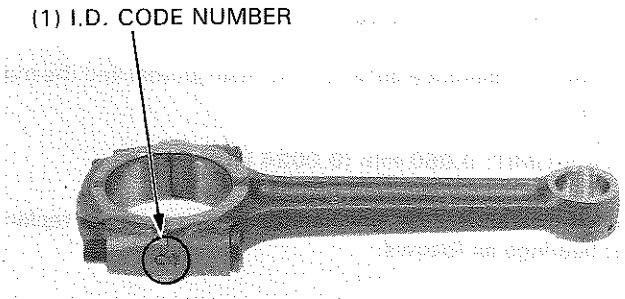
CONNECTING ROD BEARING SELECTION

If the oil clearance is beyond the service limit, select replacement bearings as follows:

Determine and record the corresponding rod I.D. code number.

NOTE

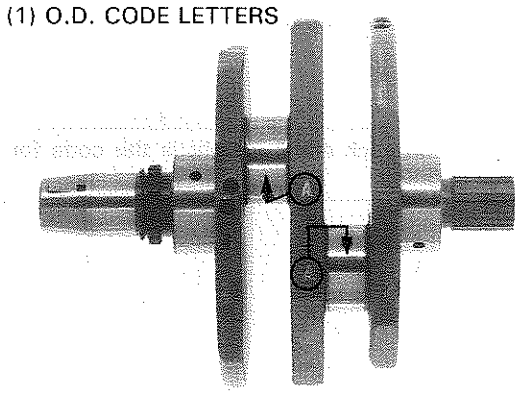
- Number 1 or 2 on the connecting rod is the code for the connecting rod.



Determine and record the corresponding crankpin O.D. code (or measure the crankpin O.D.).

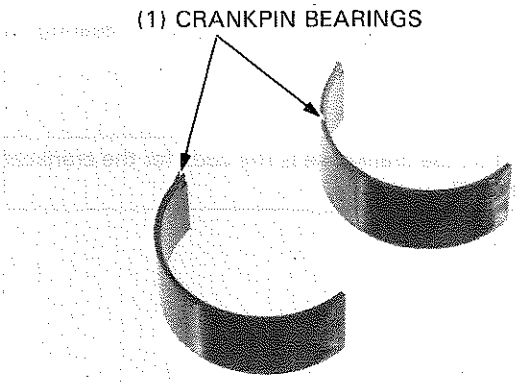
NOTE

- Letters A or B on each crank weight are the codes used for each crankpin O.D.



Cross reference the crankpin and connecting rod codes to determine the replacement bearing color.

CRANK PIN O.D. CODE / CONNECTING ROD I.D. CODE		A	B
		42.982–42.990 mm (1.6922–1.6925 in)	42.974–42.982 mm (1.6919–1.6922 in)
1	46.000–46.008 mm (1.8110–1.8113 in)	F (PINK)	E (YELLOW)
2	46.008–46.016 mm (1.8113–1.8116 in)	E (YELLOW)	D (GREEN)

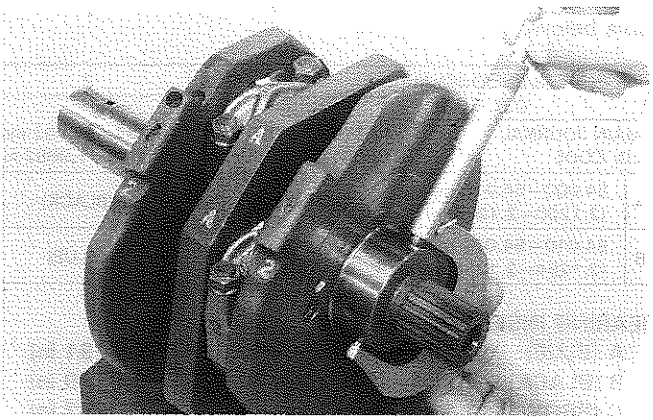


BEARING INSERT THICKNESS

GREEN: 1.495–1.499 mm (0.0589–0.0590 in)
YELLOW: 1.491–1.495 mm (0.0587–0.0589 in)
PINK: 1.487–1.491 mm (0.0585–0.0587 in)

MAIN BEARING INSPECTION

Measure the main journal O.D. and record it.

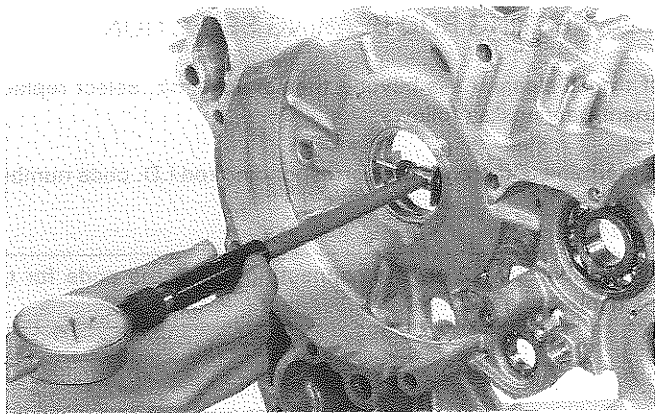


Measure the main journal bearing I.D. and record it.

Calculate the clearance between the main journal and the main bearing.

SERVICE LIMIT: 0.060 mm (0.0024 in)

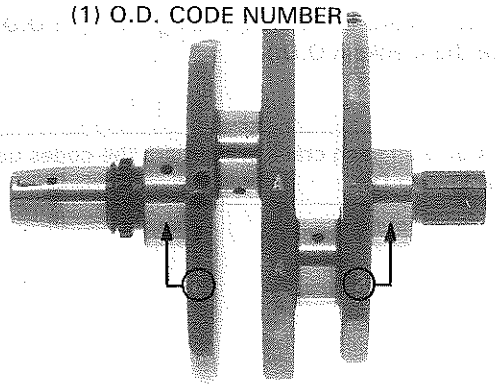
If the oil clearance is beyond service limit, select the replacement bearings as follows:



Determine and record the corresponding crankshaft main journal O.D. codes.

NOTE

- Number 1 or 2 on each crank weight is the code for the main journal O.D.

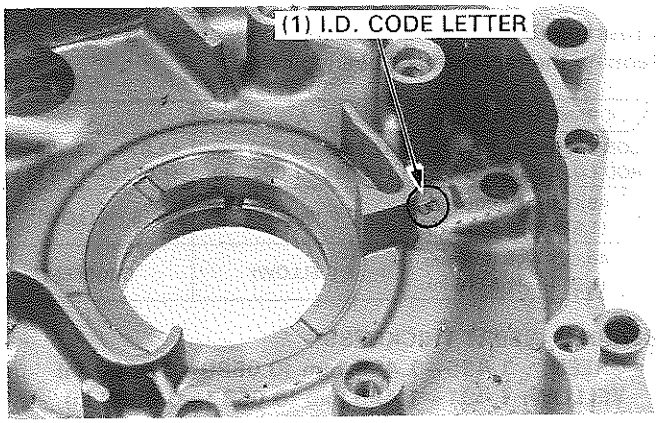


Determine the replacement main bearing.

Determine and record the corresponding main bearing I.D. codes.

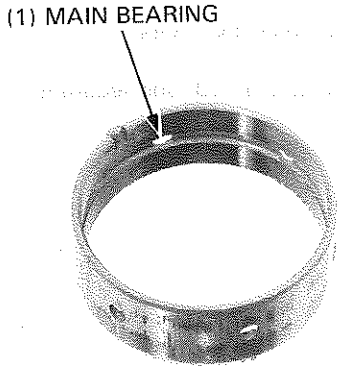
NOTE

- Letter A or B on the crankcase is the code for the crankcase main bearing I.D.



Choose replacement main bearings in accordance with the table below.

MAIN JOURNAL O.D. CODE / MAIN JOURNAL I.D. CODE		1 49.992–50.000 mm (1.9682–1.9685 mm)	2 49.984–49.992 mm (1.9679–1.9682 in)
A	54.000–54.010 mm (2.1260–2.1264 in)	C (BROWN)	B (BLACK)
B	54.010–54.020 mm (2.1264–2.1268 in)	B (BLACK)	A (BLUE)



BEARING INSERT THICKNESS

A (BLUE): 1.999–2.009 mm (0.0787–0.0791 in)
B (BLACK): 1.994–2.004 mm (0.0785–0.0789 in)
C (BROWN): 1.984–1.999 mm (0.0781–0.0787 in)

MAIN BEARING REPLACEMENT

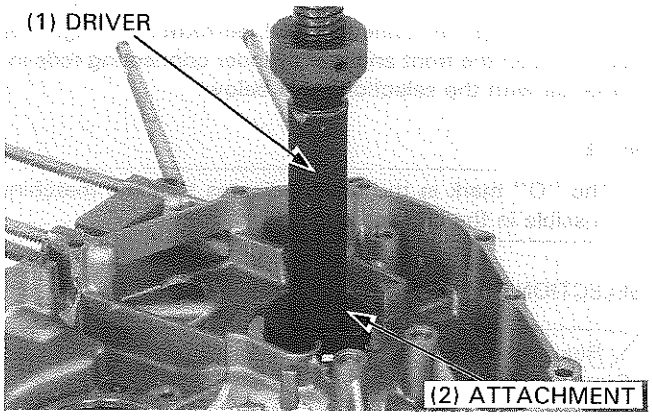
Press the main bearing out of the crankcase using a hydraulic press and special tools.

NOTE

- Always use a press to remove the main bearing.

TOOL:

Driver	**07749–0010000**
Main bearing remover attachment	**07946–ME90100**



Apply molybdenum disulfide grease to the outer surface of the main bearing.

Align the tab on the bearing with the groove in the crankcase, press the main bearing into the crankcase.

CAUTION

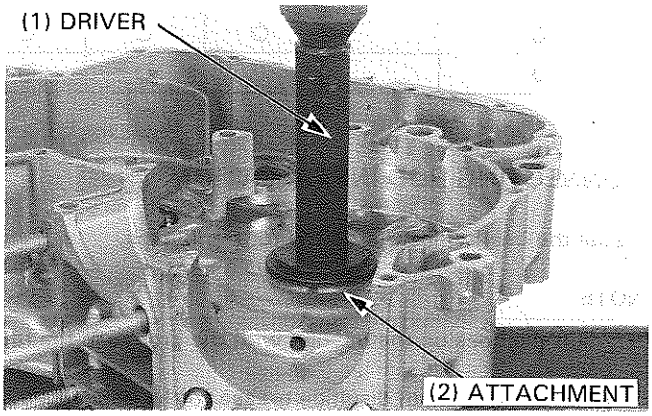
- *Be careful not to damage the bearings.*

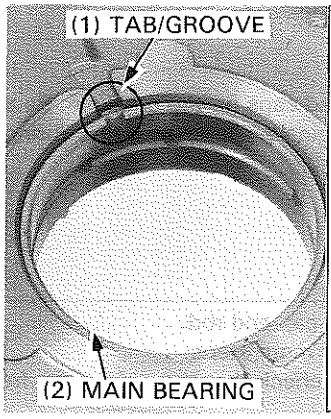
NOTE

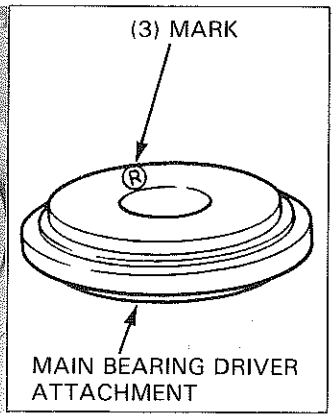
- The marks on both side of the Main Bearing Driver attachment means:
  "R" Use for right side bearing.
  "L" Use for left side bearing.

TOOLS:

Driver	**07749–0010000**
Main bearing driver attachment	**07946–ME90200**

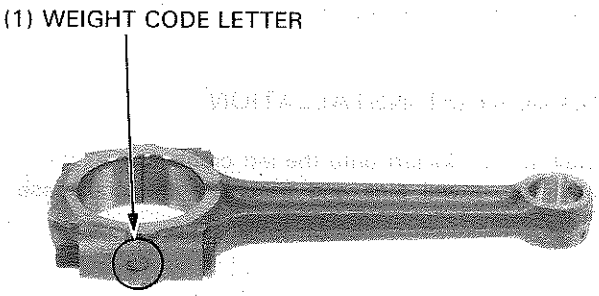






CONNECTING ROD SELECTION

The weight code is stamped on the connecting rod by alphabetical code.



When replacing the connecting rod, perform the weight selection between the front and rear cylinder connecting rods in accordance with the selection table below.

NOTE

- The "O" mark in the table indicates that the matching is possible in the crossed codes.

SELECTION TABLE

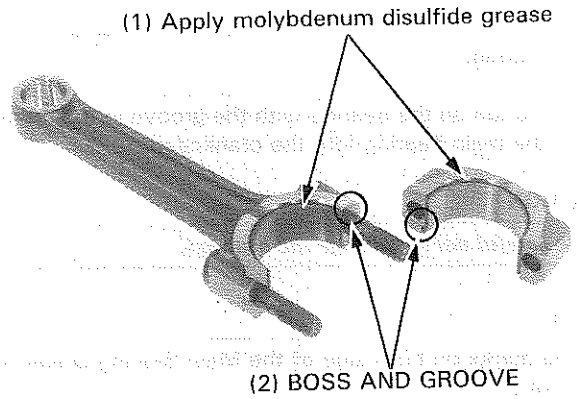
Rear rod code / Front rod code	A	B	C	D
A	O	O		
B	O	O	O	
C		O	O	O
D			O	O

CONNECTING ROD INSTALLATION

Install the bearing inserts on the rods and caps.

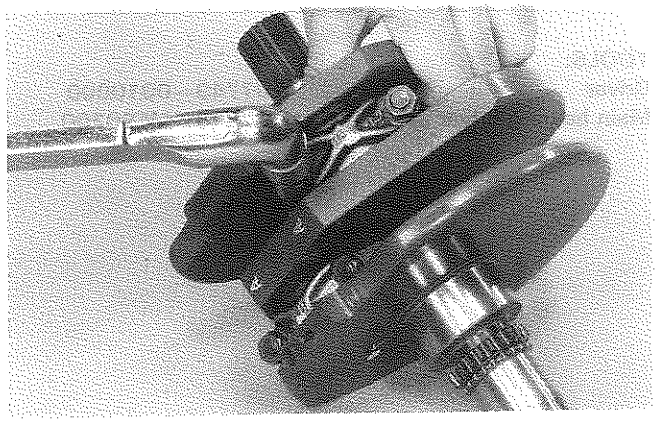
NOTE

- Align the boss on the bearing with the groove in the rod or cap.
  Apply molybdenum disulfide grease to the bearing.



Install the bearing.

Install the connecting rods and caps on the crankpin. Be sure each part is installed in its original position, as noted during removal.

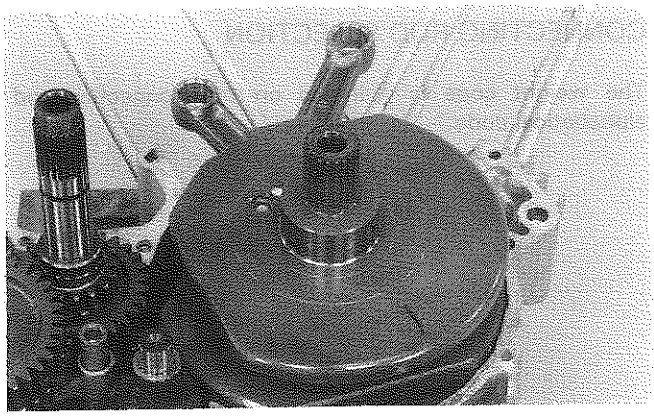


Tighten the bearing cap nuts.

NOTE

- Align the I.D. code on the cap and rod.
  Tighten the nuts in two or more steps.
  After tightening the nuts, check that the rods move freely without binding.

TORQUE: 41—45 N·m (4.1—4.5 kg-m, 30—33 ft-lb)



CRANKSHAFT INSTALLATION

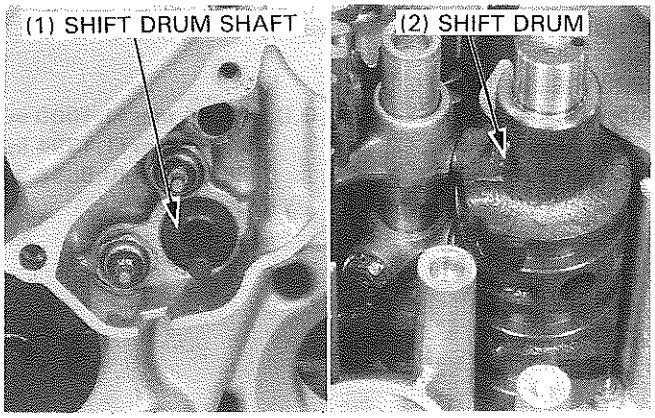
Install the crankshaft onto the left crankcase.
Install the dowel pins and assemble the crankcase (page 12-3).

TRANSMISSION

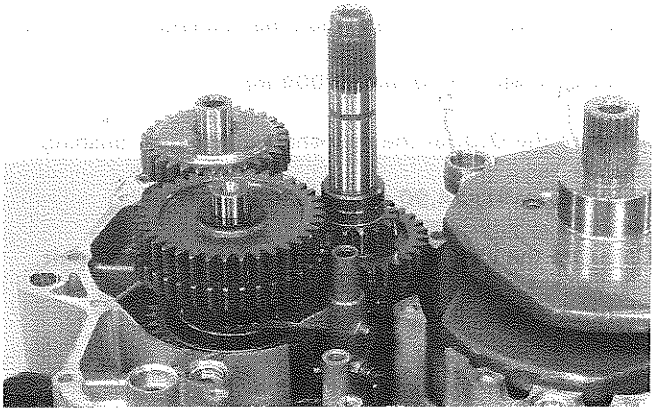
Separate the crankcase (page 12-2).

Remove the shift drum shaft from the left crankcase.

Remove the shift drum.

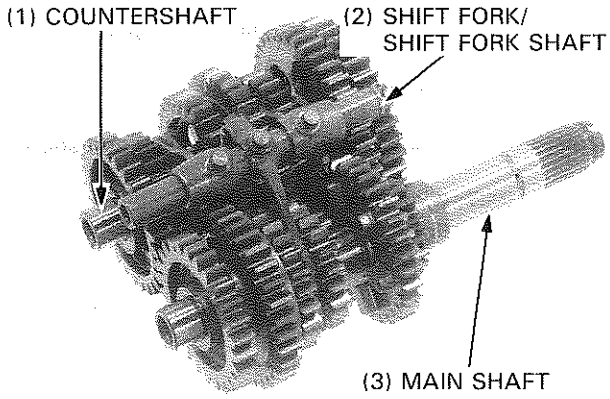


Remove the mainshaft, countershaft, shift forks and shift fork shaft together.



TRANSMISSION DISASSEMBLY

Separate the shift forks, shift fork shaft, mainshaft and countershaft assemblies from each other.



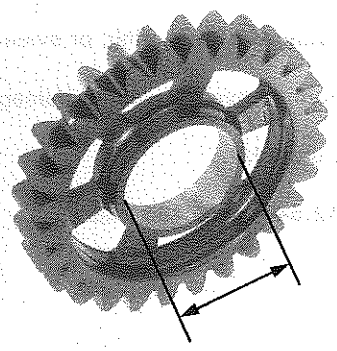
TRANSMISSION INSPECTION

Check the gear dogs, holes and teeth for excessive or abnormal wear, or evidence of insufficient lubrication.

Measure the I.D. of each gear.

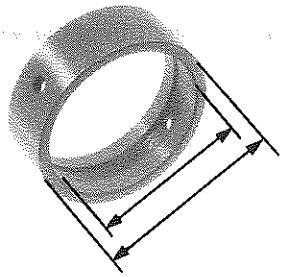
SERVICE LIMITS:

M5, M6, C1, C2, C3 gear:	**28.04 mm (1.1039 in)**
C4 gear:	**29.04 mm (1.1433 in)**



Measure the I.D. and O.D. of each gear bushing.

SERVICE LIMITS:
M5, M6, C1, C2, C3 bushing O.D.: 27.94 mm (1.1000 in)
C4 bushing O.D.: 28.94 mm (1.1394 in)
C4, M5 bushing I.D.: 25.04 mm (0.9858 in)



Calculate the clearance between the bushing and the gear.

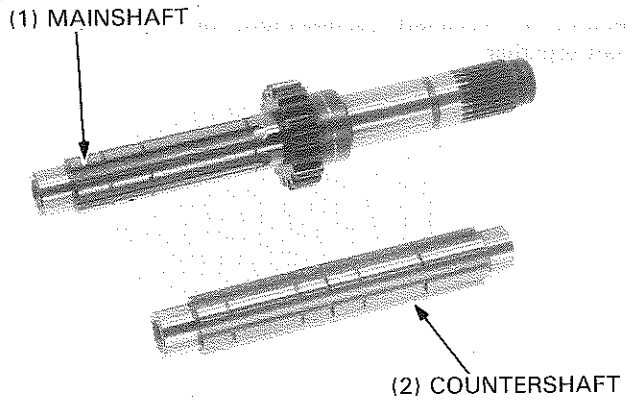
SERVICE LIMIT: 0.10 mm (0.004 in)

Measure the O.D. of the mainshaft at M5 gear bushing.

SERVICE LIMIT: 24.90 mm (0.9803 in)

Calculate the clearance between the bushing and shaft.

SERVICE LIMIT: 0.06 mm (0.0024 in)



Measure the O.D. of the countershaft at C4 gear bushing.

SERVICE LIMIT: 24.90 mm (0.9803 in)

Calculate the clearance between the bushing and shaft.

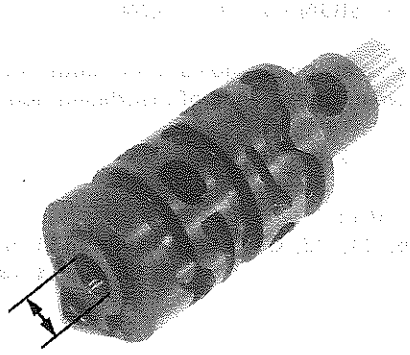
SERVICE LIMIT: 0.06 mm (0.0024 in)

GEARSHIFT DRUM INSPECTION

Inspect the shift drum end for scoring, or evidence of insufficient lubrication.
Check the shift drum groove for wear or damage.

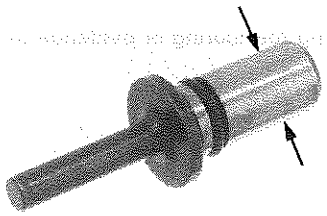
Measure the shift drum I.D.

SERVICE LIMIT: 12.54 mm (0.4937 in)



Check the shift drum shaft for wear or damage.
Replace the O-ring with a new one.
Measure the shift drum shaft O.D.

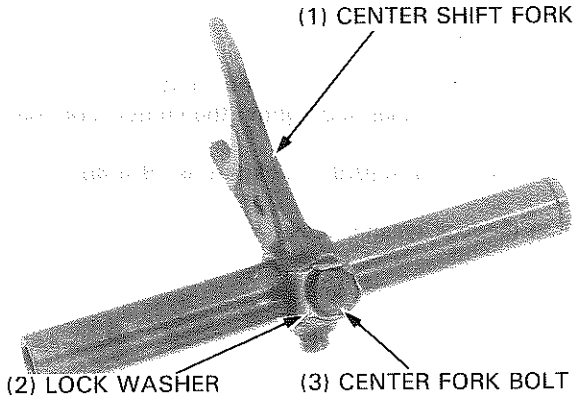
SERVICE LIMIT: 12.33 mm (0.4854 in)



SHIFT FORK DISASSEMBLY

Remove the right and left shift forks from the shift shaft.

Bend down the lock washer tab and remove the center fork mounting bolt, lock washer and fork.



GEARSHIFT FORK AND SHAFT INSPECTION

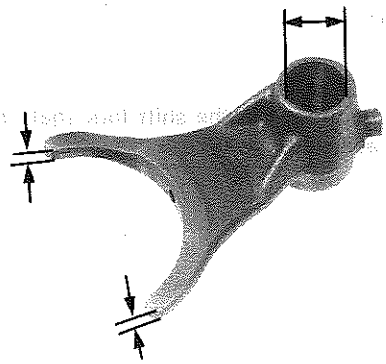
Check the shift fork and shaft for scoring or evidence of insufficient lubrication.

Measure the thickness of each fork claw.

SERVICE LIMIT: 6.20 mm (0.2441 in)

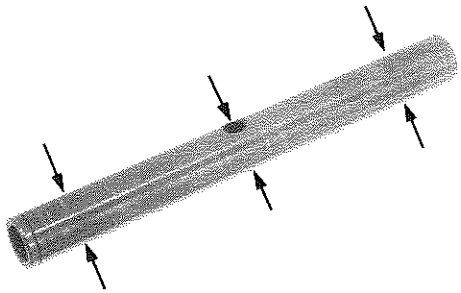
Measure the right and left shift forks I.D.

SERVICE LIMIT: 14.04 mm (0.5528 in)



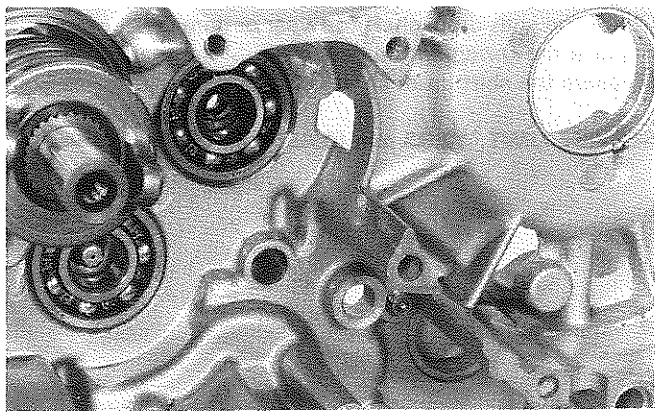
Measure the shift fork shaft O.D. at the right and left shift fork surfaces and at both ends.

SERVICE LIMIT: 13.90 mm (0.5472 in)



GEARSHIFT DRUM AND FORK SHAFT BEARING INSPECTION

Check each bearing for scoring or evidence of insufficient Lubrication.

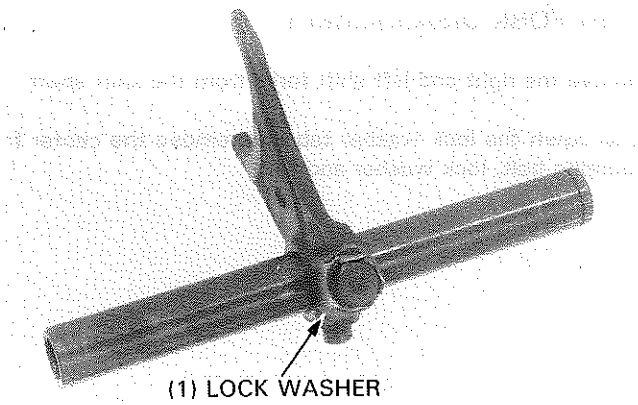


SHIFT FORK ASSEMBLY

Install the center shift fork onto the shaft.
Install the lock washer and tighten the center fork bolt.

TORQUE: 8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)

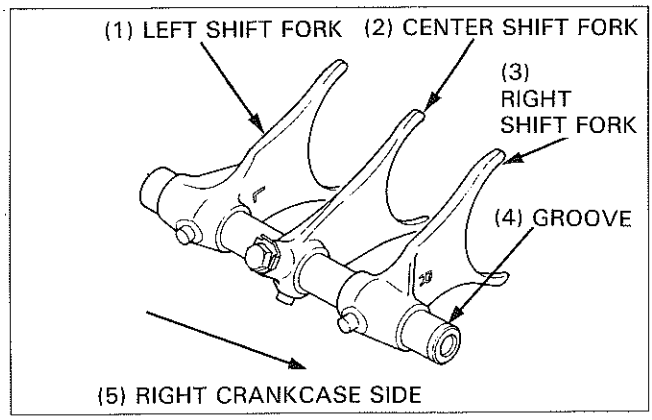
Bend up the lock washer tabs.



Install the right and left shift forks facing as shown against the center shift fork.

NOTE

- Make sure the groove in the shift fork shaft is toward the right crankcase side.



TRANSMISSION ASSEMBLY

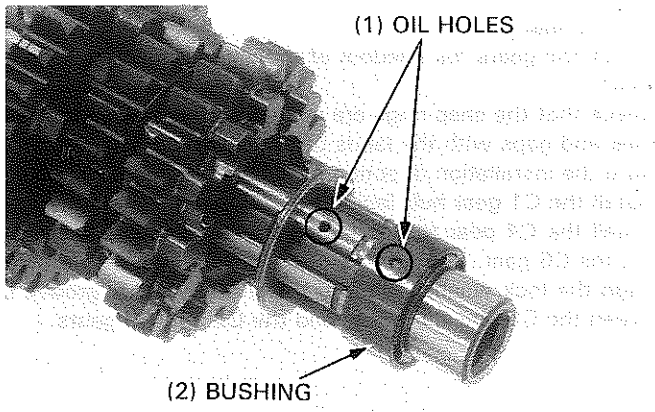
Mainshaft

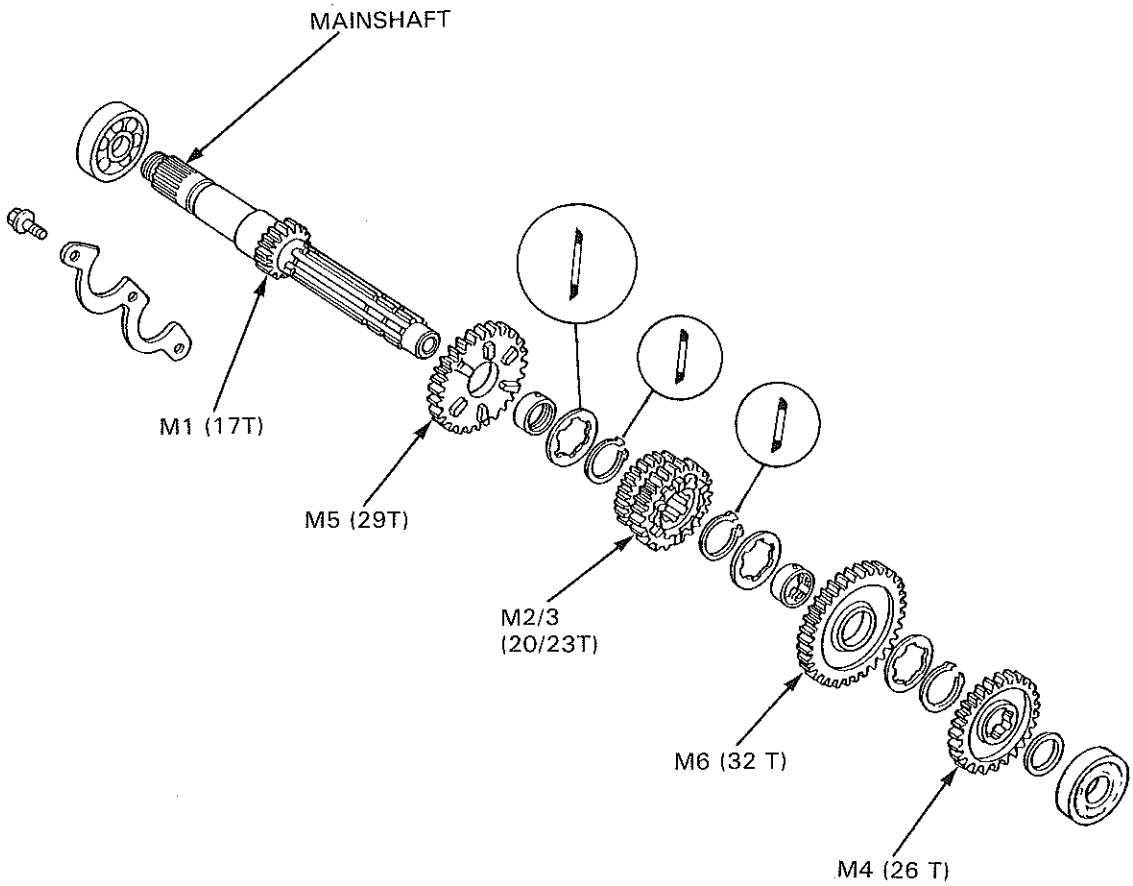
Check the gears for freedom of movement or rotation on the shaft.

Check that the snap rings are seated in the grooves and align their end gaps with the lands of splines.

Note the installation direction of each snap ring or washer.

Align the oil hole in the M3 gear bushing with the oil hole in the main shaft.





Countershaft

Check the gears for freedom of movement or rotation on the shaft.

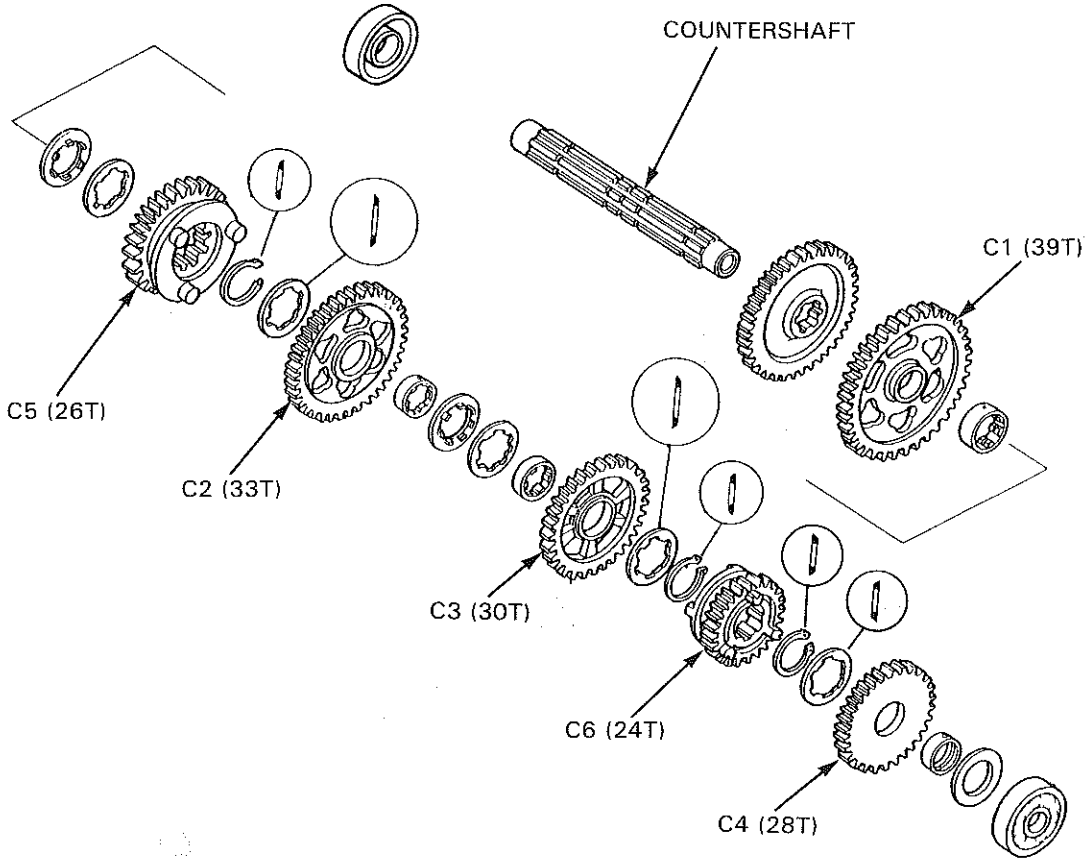
Check that the snap rings are seated in the grooves and align their end gaps with the lands of the splines.

Note the installation direction of each snap ring or washer.

Install the C1 gear hub facing the C5 gear.

Install the C4 gear recess facing the left crankcase bearing, not the C6 gear.

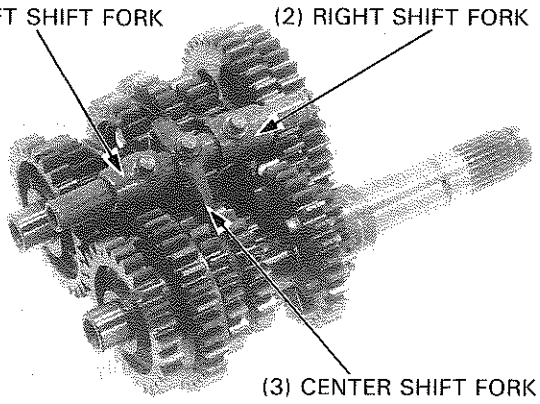
Align the lock washer tab into the thrust washer groove between the C5 and C1 gears, and the C2 and C3 gears.



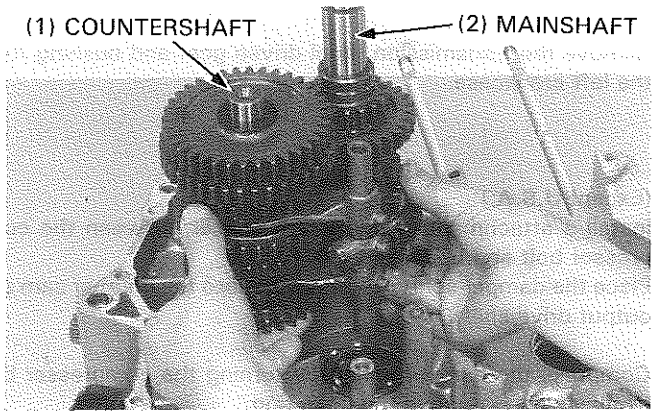
TRANSMISSION INSTALLATION

Install the shift fork onto the mainshaft and countershaft.

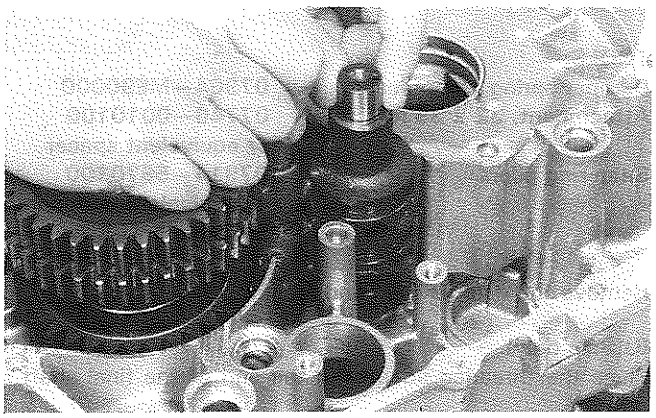
Center shift fork to M2/3 gear groove.
Right shift fork to C5 gear groove.
Left shift fork to C6 gear groove.



Install the mainshaft, countershaft, shift fork shaft and shift forks together into the left crankcase.

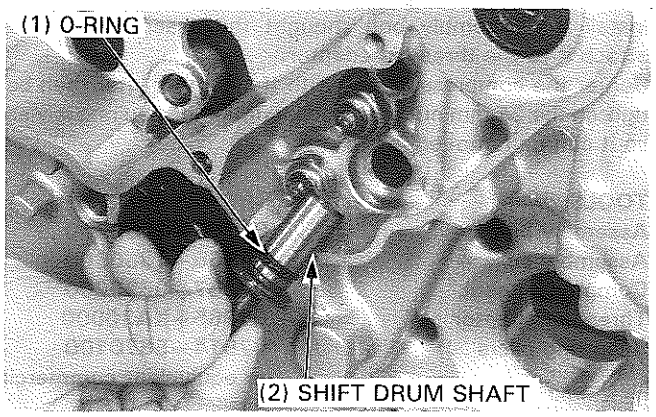


Install the shift drum and insert the shift guide pins into the drum guide grooves.



Install the shift drum shaft with a new O-ring.

Install the crankshaft and assemble the crankcase.



OUTPUT GEAR

NOTE

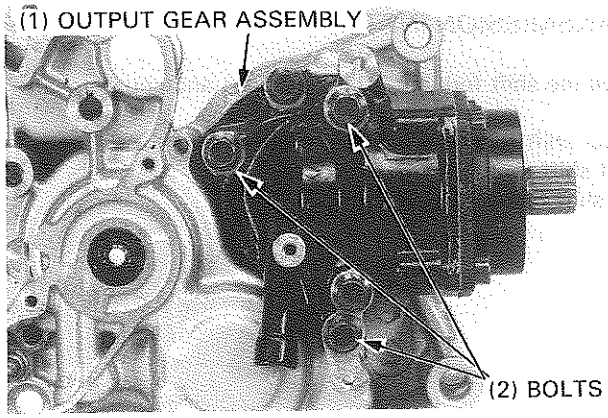
- The following output gear parts can be removed with the engine installed in the frame.
  - Output gear case
  - Output driven gear and bearing holder
  - Output drive gear bearing holder O-ring

REMOVAL

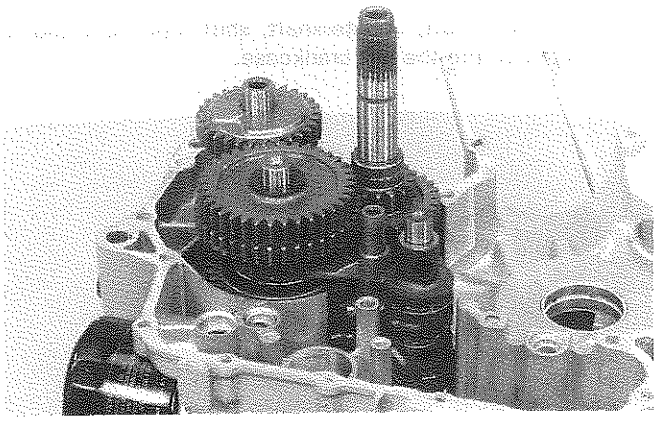
Loosen the three output gear assembly attaching the left crankcase.

Separate the crankcase (page 12-2).

Remove the transmission, final driven gear and bushing from the left crankcase.

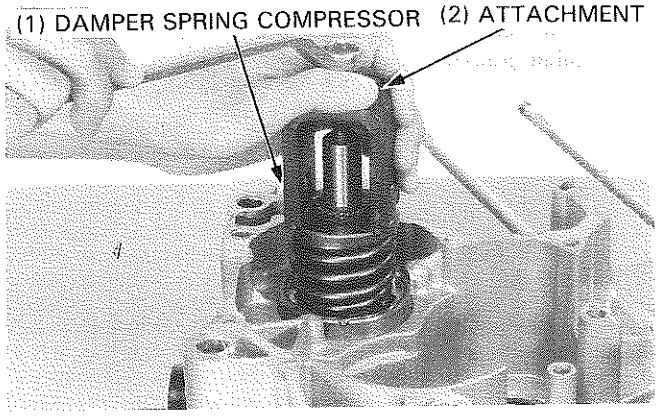


(Except U.S.A.)
Install a attachment or equivalent spacer between the compressor bolt and body.
Place the damper spring compressor onto the damper cam and output drive shaft.



Compress the damper spring by turning the compresser bolt clockwise and remove the snap ring.

Loosen and remove the compressor.

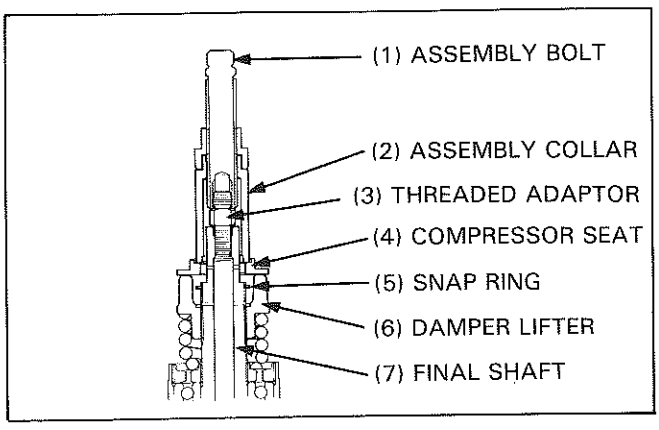


TOOLS:

Damper spring compressor	**07964—ME90000**
Attachment, 32 x 35 mm	**07746—0010100 or equivalent spacer**
Snap ring pliers	**07914—5670100 or equivalent commercially available in U.S.A.**

Remove the damper cam and spring.

(U.S.A. only)
Place the threaded adaptor in the end of the final shaft and tighten.
Place the compressor seat over the threaded adaptor with the stepped side facing upward.
Install the assembly bolt thought the assembly collar and attach it to the threaded adaptor.
Center the compressor seat with the damper lifter then begin tighten the 24 mm nut of the collar until the snap ring is visable so it can be removed.

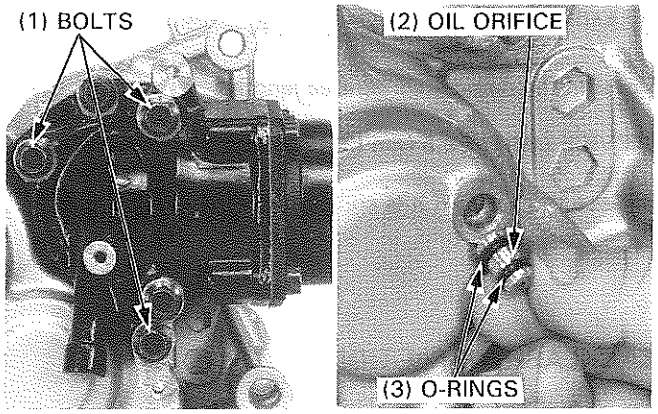


TOOLS:

Assembly bolt	**07965—1660200**
Assembly collar	**07965—1660300**
Compressor seat	**07967—9690200**
Threaded adaptor	**07965—KA30000**
Snap ring pliers	**07914—5670100 or equivalent commercially available in U.S.A.**

Remove the three output gear assembly attaching bolts and output gear assembly.

Remove the oil orifice and O-rings.

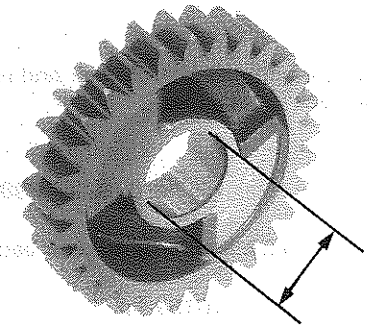


OUTPUT GEAR INSPECTION

Check the gear grooves and teeth for excessive or abnormal wear, or evidence of insufficient lubrication.

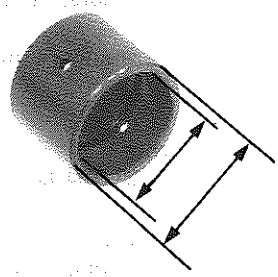
Measure the final driven gear I.D.

SERVICE LIMIT: 24.10 mm (0.9488 in)



Measure the final driven gear bushing I.D. and O.D.

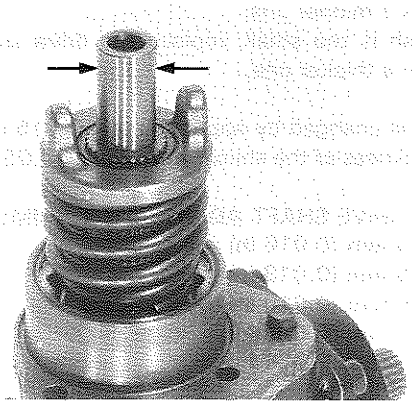
SERVICE LIMITS:
I.D. 20.10 mm (0.7913 in)
O.D. 23.70 mm (0.9331 in)



Measure the output drive gear O.D.

SERVICE LIMIT: 19.970 mm (0.7862 in)

Calculate the clearance between the output drive gear and bushing.

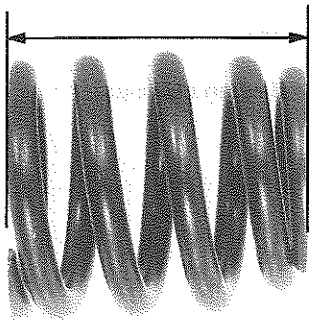


DAMPER SPRING INSPECTION

Measure the damper spring free length.

SERVICE LIMIT: 62.5 mm (2.4606 in)

Replace the spring if it is shorter than the service limit.



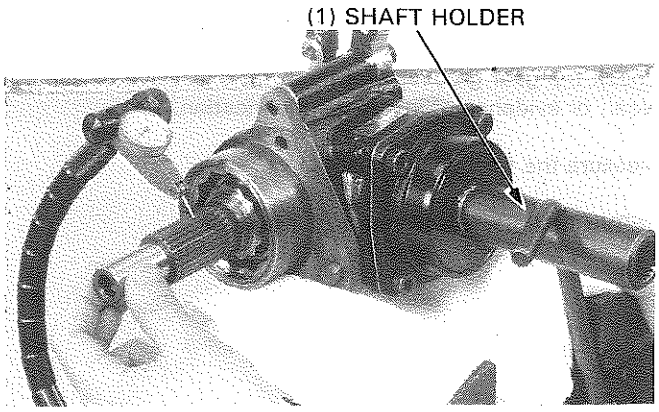
BACKLASH INSPECTION

Place the output gear case in a vise with soft jaws or use a shop towel.

Set a horizontal type dial indicator on the final drive shaft as shown.

Hold the driven gear with the shaft holder and rotate the drive shaft until gear slack is taken up.

TOOL:
Shaft holder: 07923—6890101



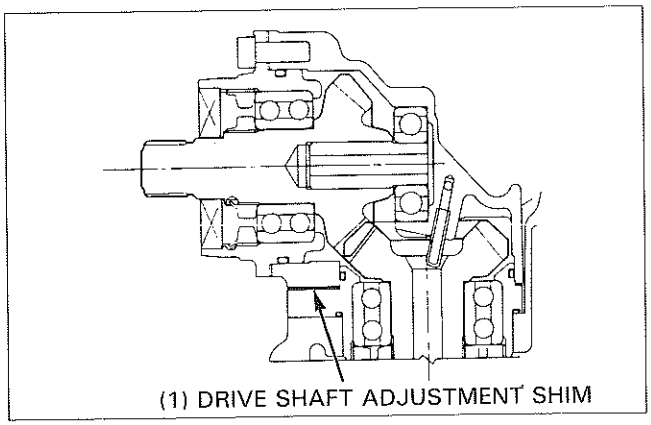
Turn the drive shaft back and force to read backlash.

SERVICE LIMIT: 0.4 mm (0.0157 in)

Remove the dial indicator. Turn the output drive shaft 120 degrees and measure the backlash as part of the same procedure.

Repeat this procedure once more, at another 120 degrees.

Compare the difference of the three measurements.



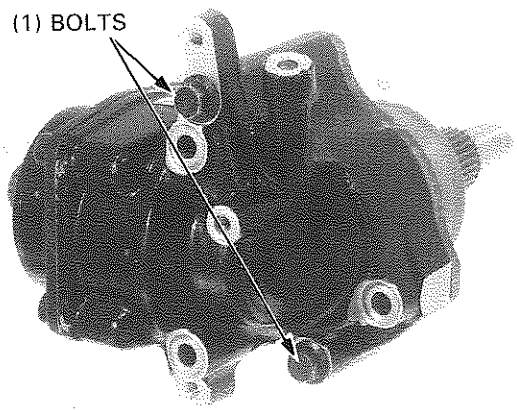
Difference of measurements
SERVICE LIMIT: 0.10 mm (0.004 in)

If the difference of the measurements exceeds the service limit, it indicates that the bearing is not installed squarely. Inspect the bearings and reinstall if necessary.

If backlash is excessive, replace the drive shaft adjustment shim with a thinner one.
If backlash is too small, replace the drive shaft adjustment shim with a thicker one.

Backlash is changed by approximately 0.015 mm (0.0006 in) when thickness of the shim is changed by 0.05 mm (0.002 in).

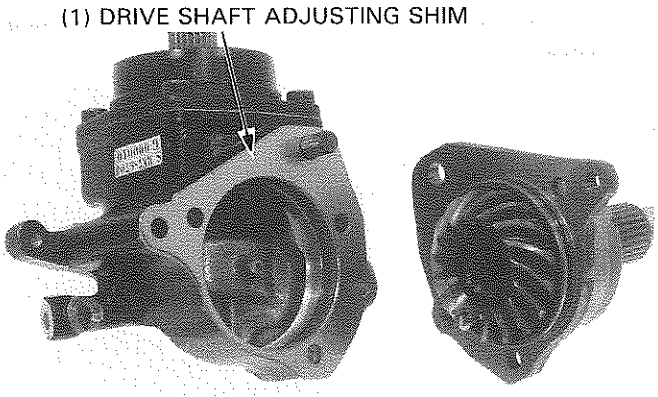
OUTPUT DRIVE SHAFT ADJUSTMENT SHIMS:
- **A: 0.40 mm (0.016 in)**
- **B: 0.45 mm (0.018 in)**
- **C: 0.50 mm (0.020 in)——Standard**
- **D: 0.55 mm (0.022 in)**
- **E: 0.60 mm (0.024 in)**



To replace the output drive shaft adjustment shim, remove the output gear case from the bearing holder.

After replacing the shim, install the gear case and tighten the bolts.

TORQUE: 30—34 N·m (3.0—3.4 kg-m, 22—25 ft-lb)

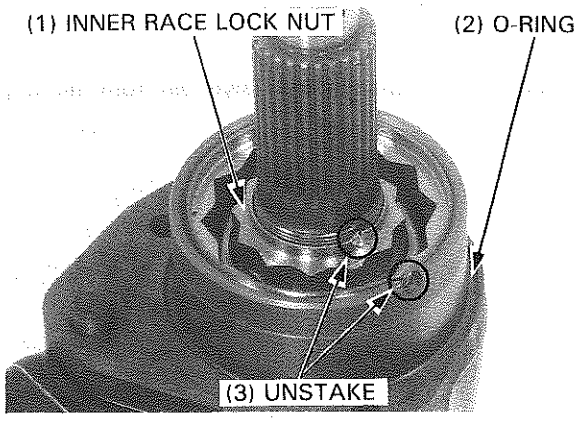


OUTPUT DRIVE SHAFT BEARING REPLACEMENT

Remove the O-ring.

Place the output gear case in a vise with soft jaws, being careful not to distort it.

Unstake the bearing inner race lock nut with a drill or grinder. Be careful that metal particles do not enter the bearing and the threads on the shaft are not damaged.



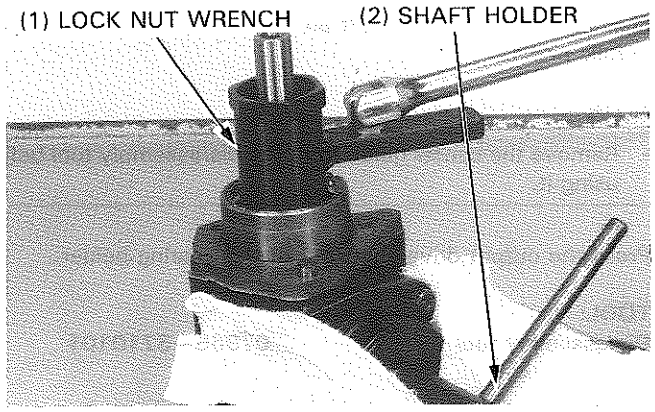
Place the shaft holder on the driven gear shaft, wedging it against the vise to lock the shaft.

Remove the bearing inner lock nut and discard it.

TOOLS:

Shaft holder	**07923—6890101**
Lock nut wrench, 30 x 64 mm	**07916—MB00001**

Remove the shaft holder.

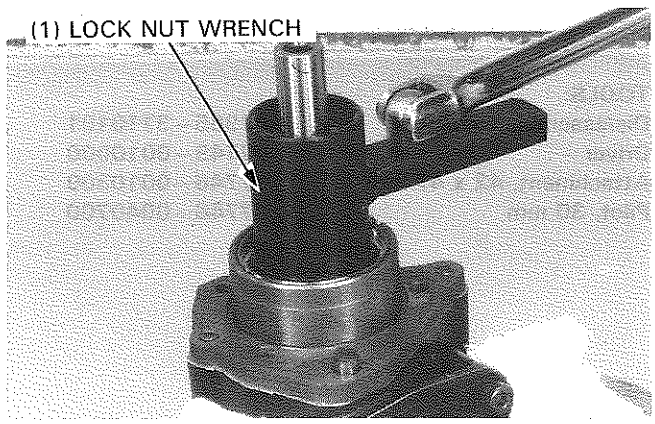


Unstake the bearing outer lock nut with a punch.

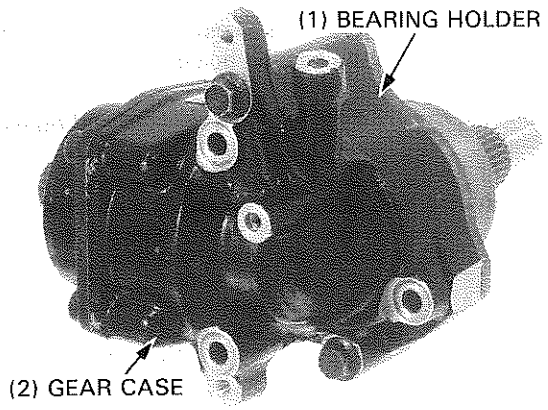
Remove the bearing outer lock nut and discard it.

TOOL:

Lock nut wrench, 30 x 64 mm	**07916—MB00001**

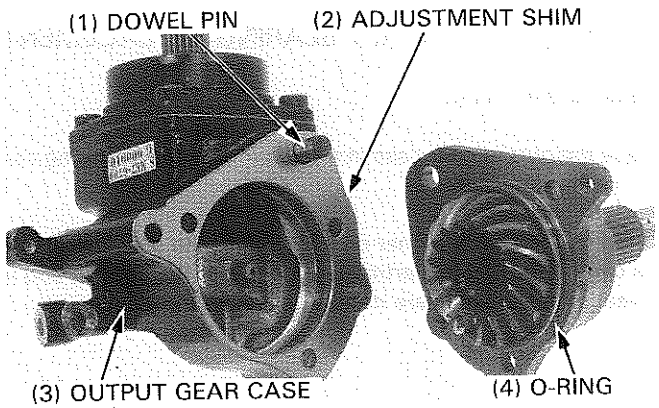


Remove the output drive shaft bearing holder from the output gear case.



Remove the O-ring from the bearing holder.

Remove the adjustment shim and dowel pin from the output gear case.



Place the output drive shaft and a dis/assembly tool in a hydraulic press.

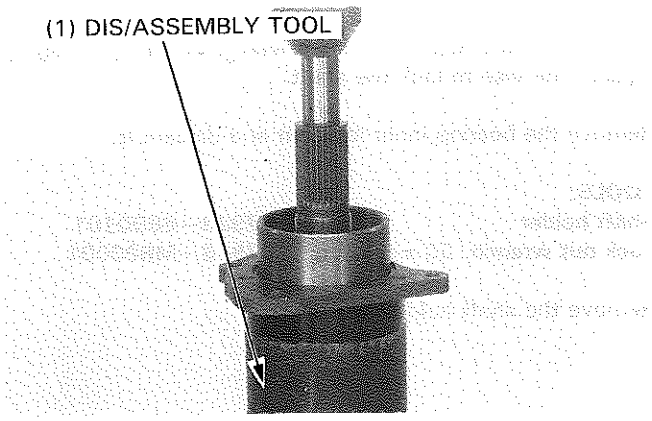
NOTE

- Remove the center guide from the dis/assembly tool before using it.

Press the output drive shaft out of the bearing holder.

TOOL:

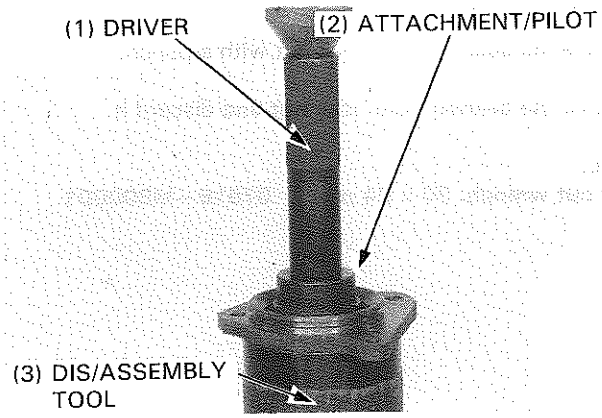
Dis/assembly tool	**07965—3710101**



Place the bearing holder in a press and remove the bearing.

TOOLS:

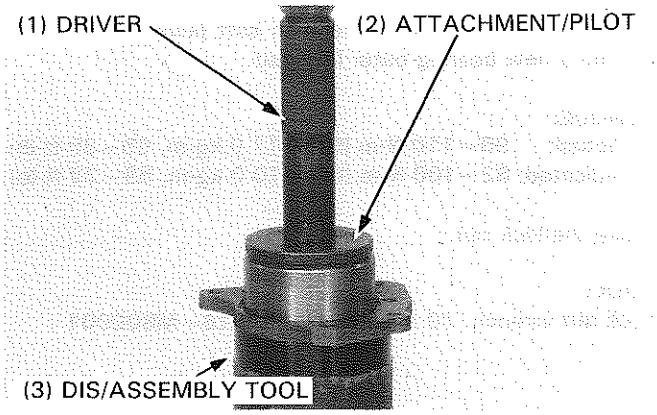
Dis/assembly tool	**07965—3710101**
Driver	**07749—0010000**
Attachment, 42 x 47 mm	**07746—0010300**
Pilot, 30 mm	**07746—0040700**



Press a new bearing in the bearing holder.

TOOLS:

Dis/assembly tool	**07965—3710101**
Driver	**07749—0010000**
Attachment, 62 x 68 mm	**07746—0010500**
Pilot, 30 mm	**07746—0040700**



NOTE

- If the output drive shaft requires replacement, the drive and driven shafts must be replaced as a set.

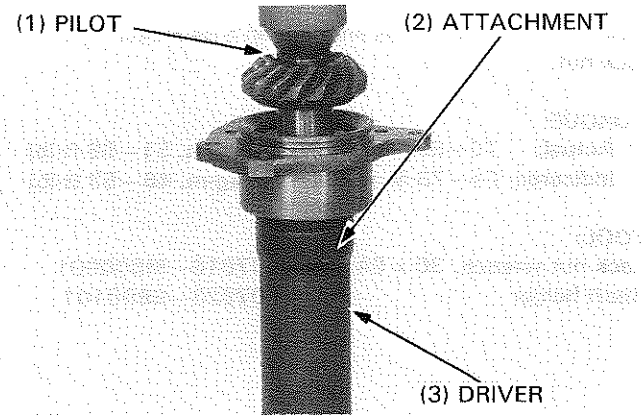
Support the bearing inner race and press the output drive shaft with a pilot.

NOTE

- Place the pilot's threaded end into the output drive shaft.

TOOLS:

Inner driver	**07746—0030100**
Attachment, 30 mm I.D.	**07746—0030300**
Pilot, 20 mm	**07746—0040500**

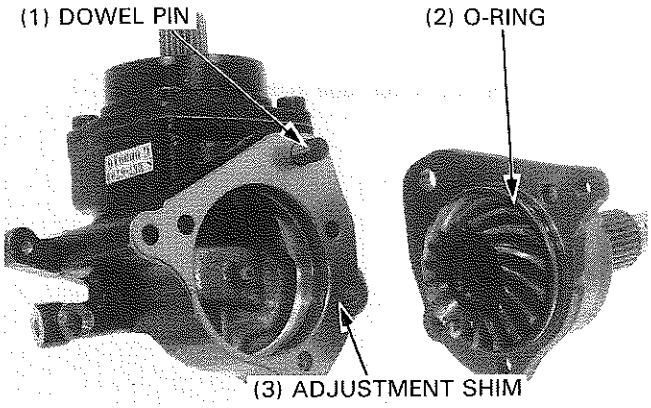


Install the dowl pin.
Place the adjustment shim over the bearing holder.

NOTE

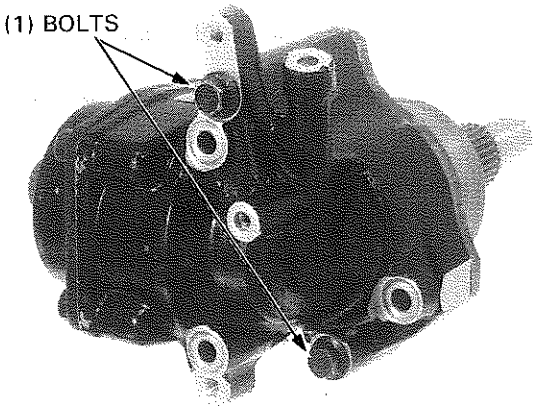
- If the bearing holder and/or gear case is replaced, a new adjustment shim must be selected (page 13-19, Backlash inspection).

Install a new O-ring.



Install the bearing holder onto the gear case and tighten the bolts.

TORQUE: 30—34 N·m (3.0—3.4 kg-m, 22—25 ft-lb)

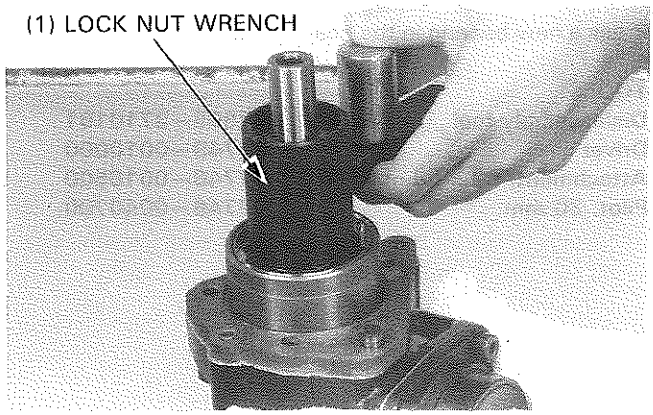


Place the gear case in a vise with soft jaws and install and tighten a new bearing outer lock nut.

TORQUE:
Actual: 90–110 N·m (9.0–11.0 kg-m, 65–80 ft-lb)
Indicated: 82–100 N·m (8.2–10.0 kg-m, 59–72 ft-lb)

Stake the lock nut.

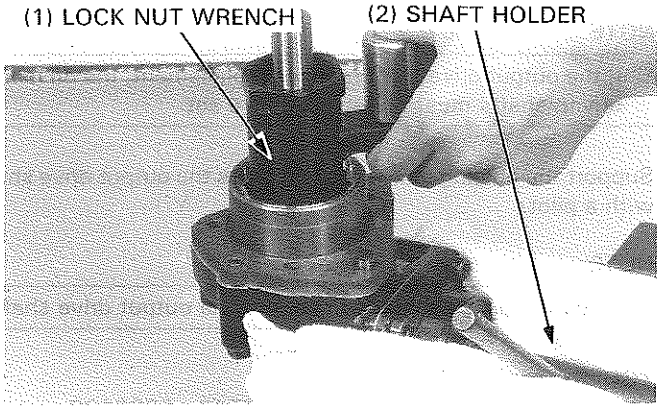
TOOL:
Lock nut wrench, 30 x 64 mm 07916–MB00001



Hold the shaft and install and tighten a new bearing inner race lock nut.

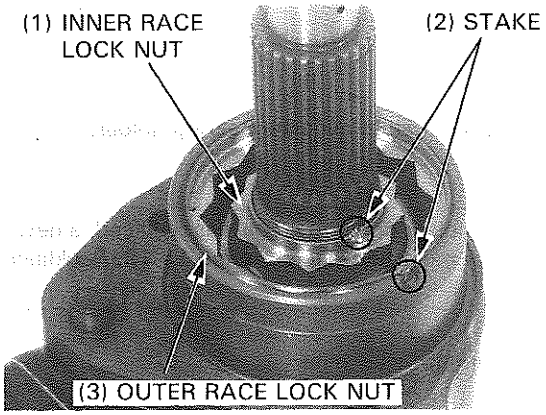
TORQUE:
Actual: 70–80 N·m (7.0–8.0 kg-m, 51–58 ft-lb)
Indicated: 64–73 N·m (6.4–7.3 kg-m, 46–53 ft-lb)

TOOL:
Lock nut wrench, 30 x 64 mm 07916–MB00001
Shaft holder 07923–6890101



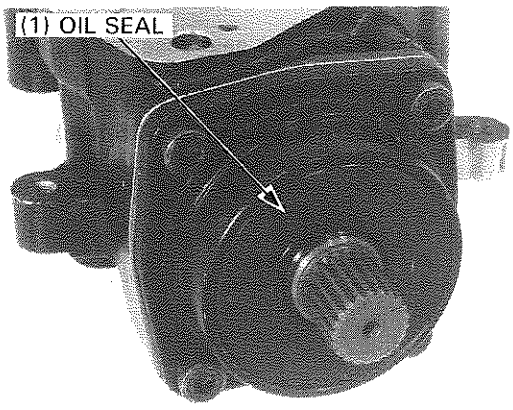
Remove the shaft holder.

Stake the inner and outer race lock nuts.

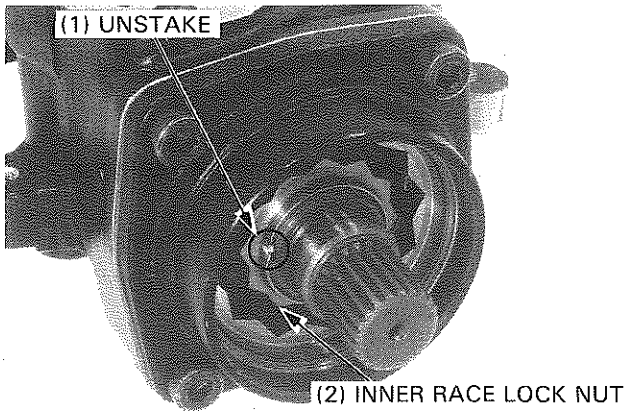


OUTPUT DRIVEN GEAR BEARING REPLACEMENT

Remove the output driven gear oil seal from the driven gear bearing holder.



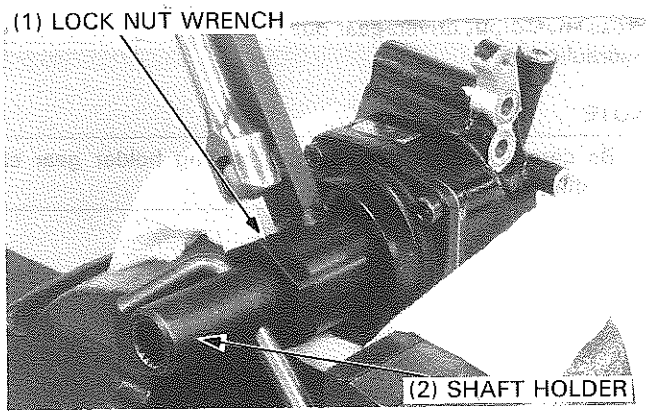
Pry or drill the staked edge of the output driven gear bearing inner race lock nut.



Hold the output driven gear with the shaft holder and remove the output driven gear bearing inner race lock nut.

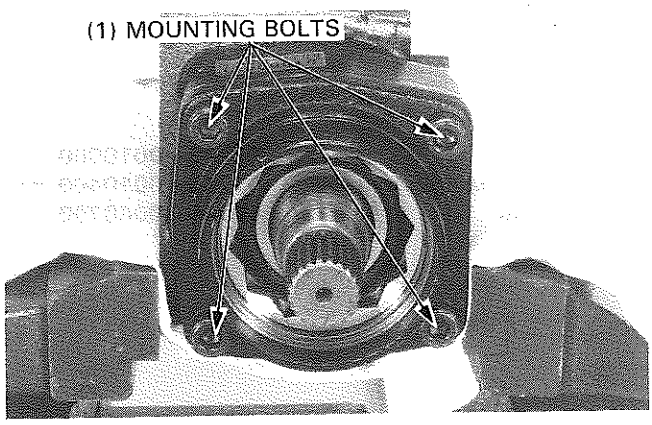
TOOLS:

Shaft holder	**07923–6890101**
Lock nut wrench, 30 x 64 mm	**07916–MB00001**

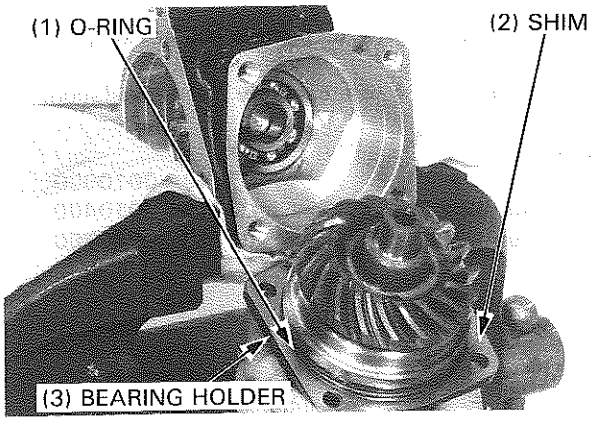


Remove the driven gear bearing holder mounting bolts and the holder from the output gear case.

Pry or drill the staked edge of the output driven gear bearing outer race lock nut.

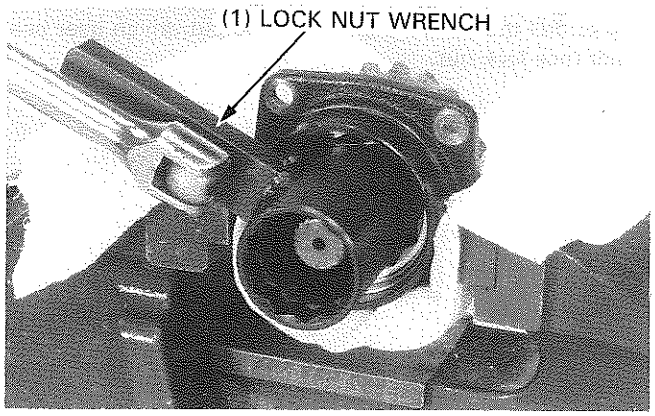


Remove the O-ring and shim from the bearing holder.



Place the output driven gear bearing holder in a vise with soft jaws. Unstake and remove the output driven gear bearing outer race lock nut.

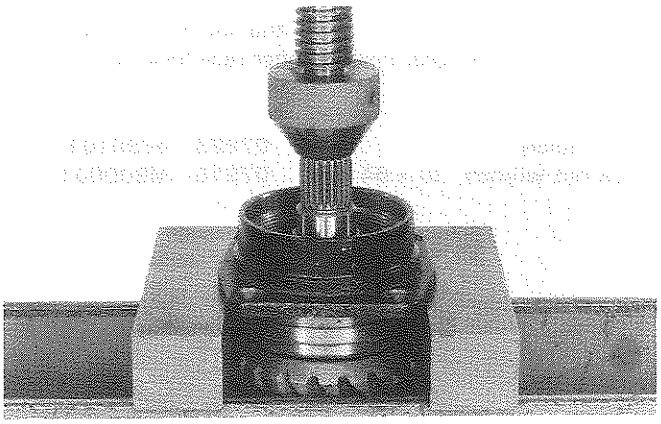
TOOL:
Lock nut wrench, 30 x 64 mm 07916—MB00001



Press the output driven gear out of the bearing holder using a hydraulic press.

NOTE

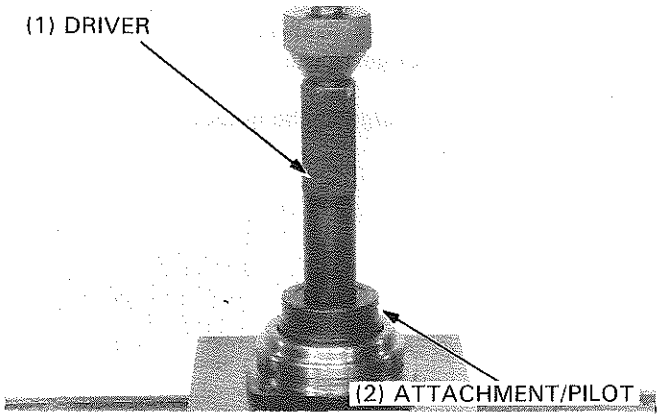
- Be careful not to damage the bearing holder gear case mating surface.



Press the output driven gear bearing out of the bearing holder using a hydraulic press.

TOOLS:

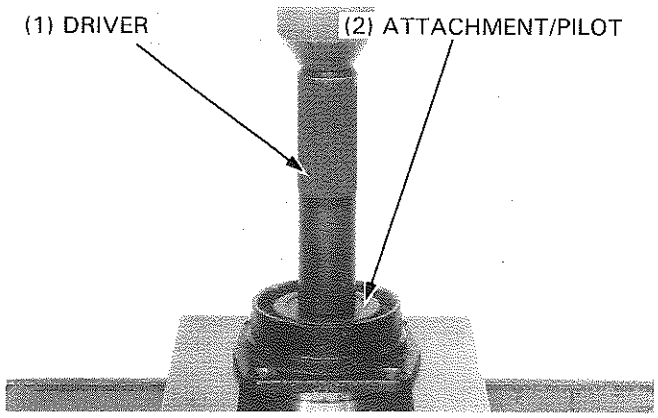
Driver	**07749—0010000**
Attachment, 52 x 55 mm	**07746—0010400**
Pilot, 30 mm	**07746—0040700**



Press a new bearing into the bearing holder using a hydraulic press.
Make sure the bearing rotates freely after installation.

TOOLS:

Driver	**07749—0010000**
Attachment, 52 x 55 mm	**07746—0010400**
Pilot, 30 mm	**07746—0040700**



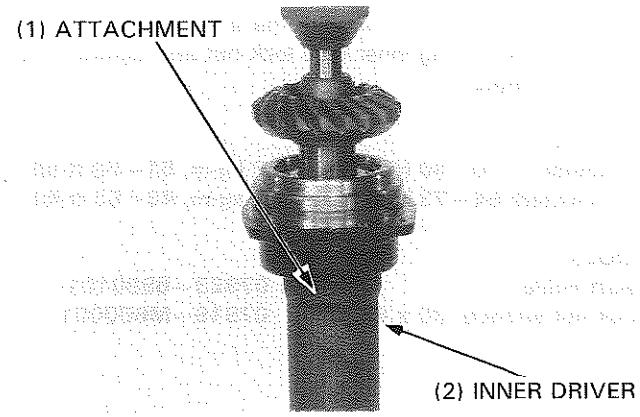
NOTE

- If the output driven gear requires replacement, the driven gear and drive shaft must be replaced as a set.

Support the bearing inner race and press the output driven gear in the bearing holder using a hydraulic press.

TOOLS:

Inner driver	**07746—0030100**
Attachment, 30 mm I.D.	**07746—0030300**



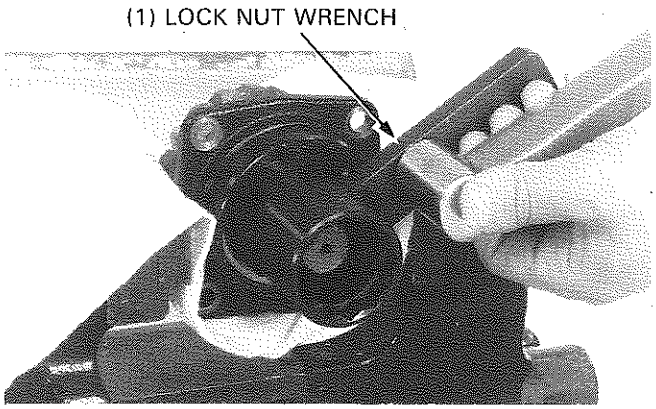
Place the bearing holder into a vise with soft jaws.
Install and tighten a new bearing outer race lock nut to the specified torque value.

TORQUE:

Actual: 90—110 N·m (9.0—11.0 kg-m, 65—80 ft-lb)
Indicated: 82—100 N·m (8.2—10.0 kg-m, 59—72 ft-lb)

TOOL:

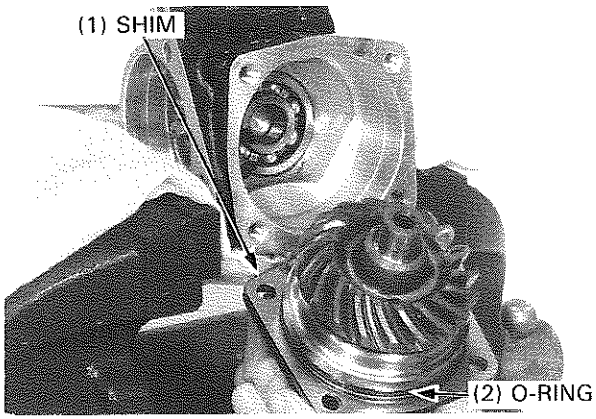
Lock nut wrench, 30 x 64 mm	**07916—MB00001**



Install the correct shim and a new O-ring

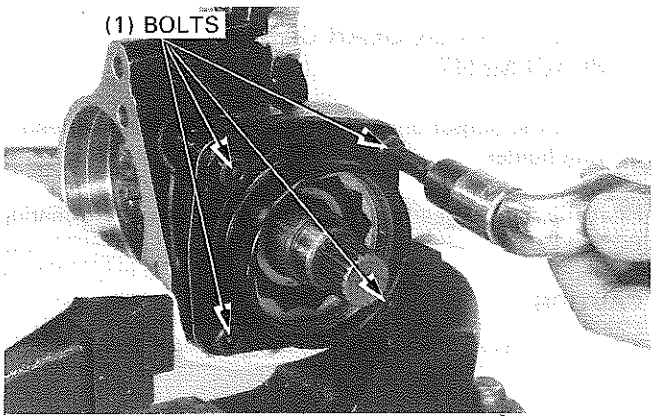
NOTE

- When the gear set, driven gear bearing and/or gear case has been replaced, use the 0.50 mm (0.020 in) shim for initial reference.



Install the driven gear bearing holder onto the gear case.
Coat the bolt threads with clean engine oil and install them.

TORQUE: 30—34 N·m (3.0—3.4 kg-m, 22—25 ft-lb)

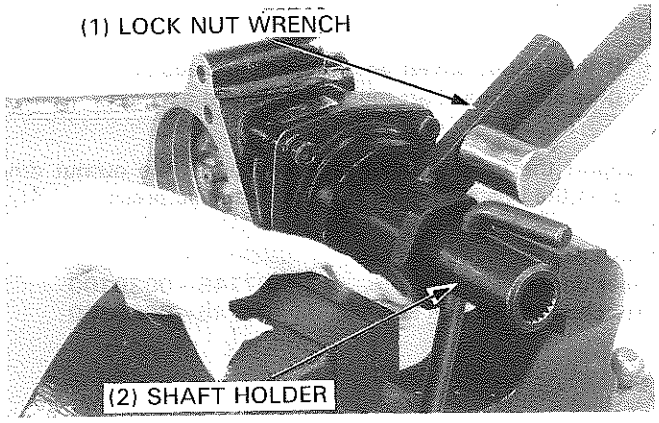


Hold the output driven gear with the shaft holder.
Install a new bearing inner race lock nut and tighten it to the specified torque.

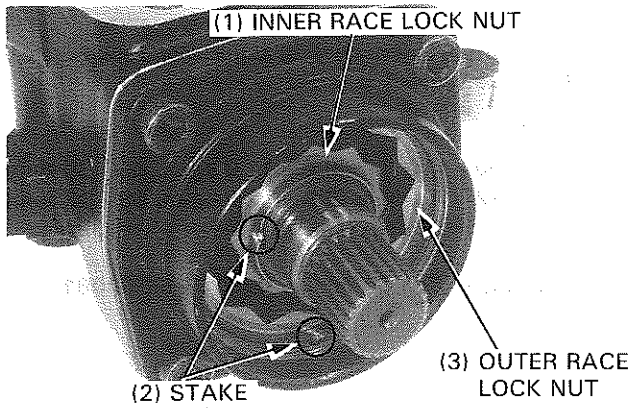
TORQUE:
Actual: 70—80 N·m (7.0—8.0 kg-m, 51—58 ft-lb)
Indicated: 64—73 N·m (6.4—7.3 kg-m, 46—53 ft-lb)

TOOLS:

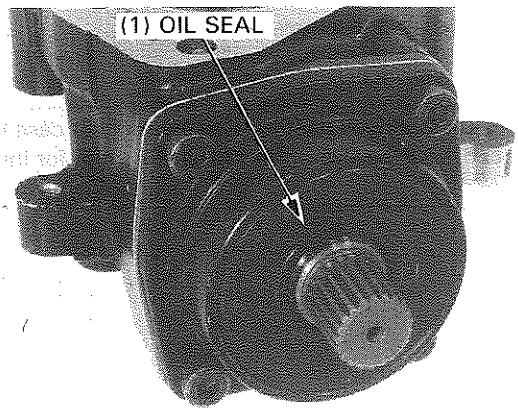
Shaft holder	**07923—6890101**
Lock nut wrench, 30 x 64 mm	**07916—MB00001**



Stake the inner and outer race lock nuts.



Install a new oil seal to the driven gear bearing holder.



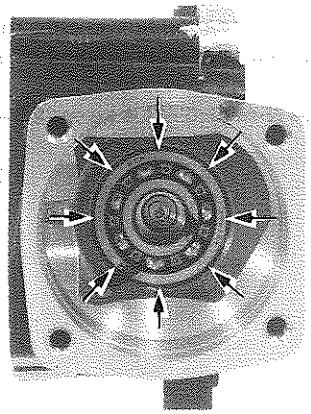
OUTPUT DRIVEN GEAR CASE BEARING REPLACEMENT

Remove the output drive shaft bearing holder and driven gear bearing holder.

Heat the output gear case around the driven shaft bearing to 80°C (176°F)

CAUTION

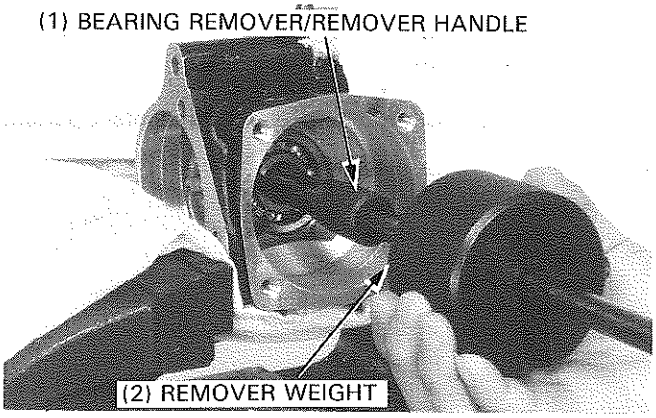
- *Always wear gloves when handling a heated gear case.*



Remove the gear case bearing with the bearing puller.

TOOLS:

Bearing remover, 17 mm	**07936—3710300**
Remover handle	**07936—3710100**
Remover weight	**07741—0010201 or 07936—3710200**

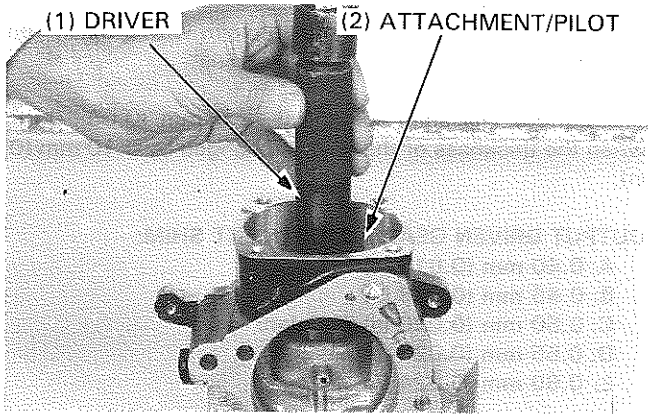


Drive a new gear case bearing into the gear case.

TOOLS:

Driver	**07749—0010000**
Attachment, 42 x 47 mm	**07746—0010300**
Pilot, 17 mm	**07746—0040400**

Install the driven gear bearing holder and tighten the bolts. (page 13-27).
Install the drive shaft bearing holder and tighten the bolts (page 13-23).



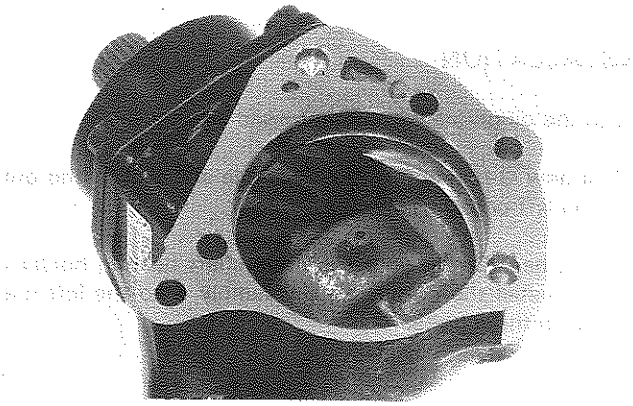
GEAR TOOTH CONTACT PATTERN CHECK

Remove the drive shaft and driven gear bearing holders.

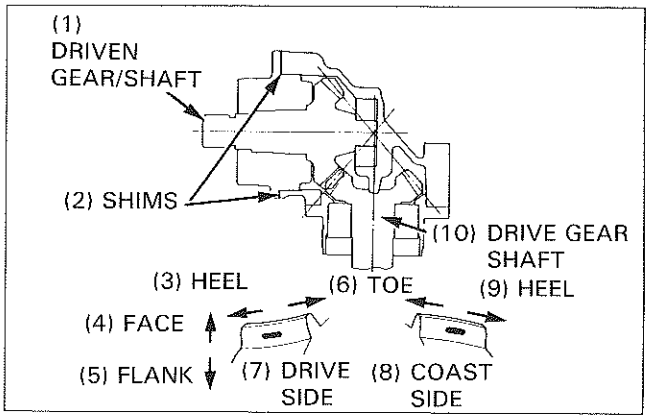
Apply Prussian Blue to the driven gear teeth.

Install the drive shaft and driven gear bearing holders with the standard shims.

Rotate the drive gear several times in the normal direction of rotation.
Check the gear tooth contact pattern after removing the drive gear.

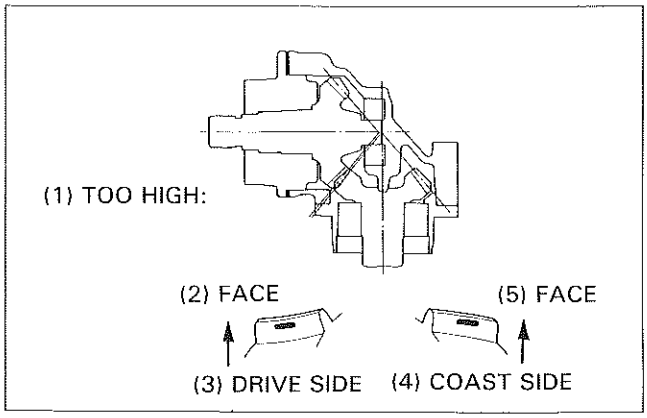


Contact is normal if Prussian Blue is transfered to the approximate center of each tooth and slightly to the toe.



If the pattern is not correct, remove and replace the driven gear adjustment shim.

Replace the shim with a thinner one if the contact pattern is too high.

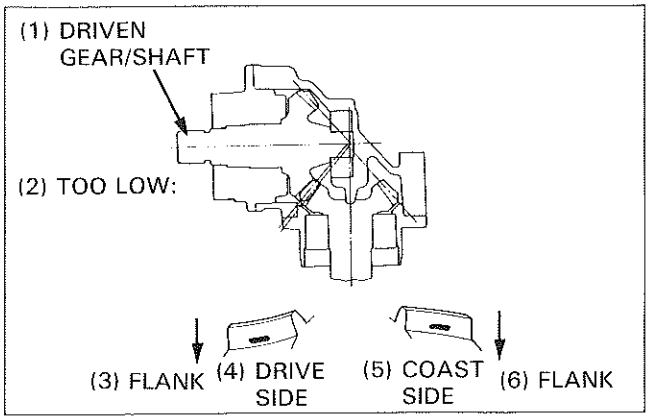


Replace the driven gear adjustment shim with a thicker one if the contact pattern is too low.

The pattern will shift about 1.5—2.0 mm (0.06—0.08 in) when the thickness of the shim is changed by 0.10 mm (0.04 in).

OUTPUT DRIVEN GEAR ADJUSTMENT SHIM:

- **A: 0.40 mm (0.016 in)**
- **B: 0.45 mm (0.018 in)**
- **C: 0.50 mm (0.020 in) Standard**
- **D: 0.55 mm (0.022 in)**
- **E: 0.60 mm (0.024 in)**



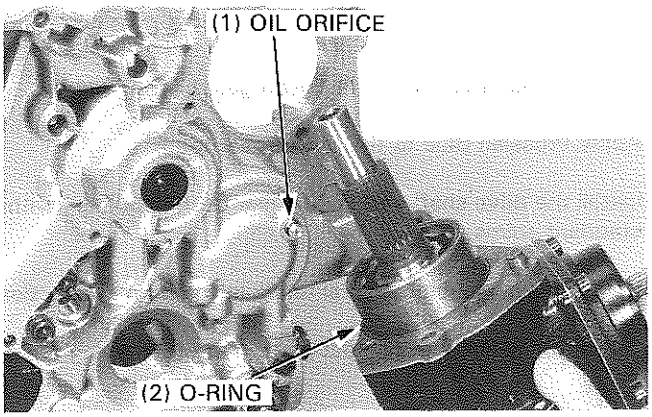
Check the backlash (See page 13-19).

INSTALLATION

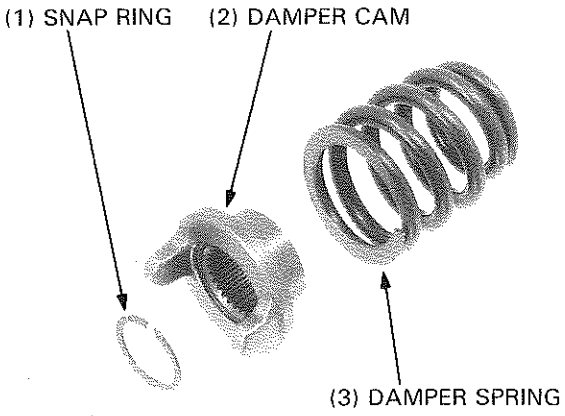
Clean the oil orifice with compressed air.

Install new O-rings onto the oil orifice and install lthe orifice into the left crankcase.

Install a new O-ring onto the drive shaft bearing holder and loosely install the output gear assembly onto the left crankcase with three bolts.



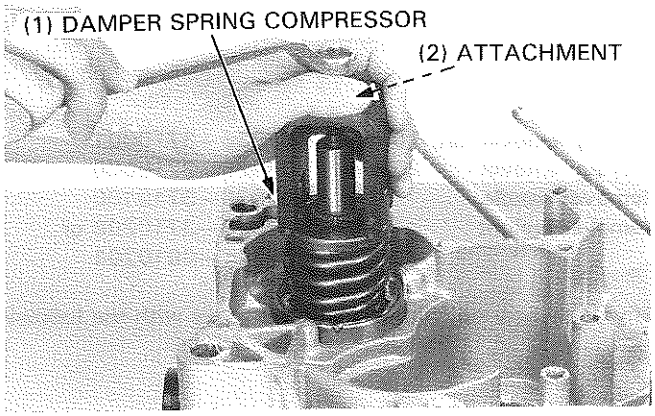
Install the damper spring over the output drive shaft with the closely wound coil facing the crankcase.
Install the damper cam onto the output drive shaft.



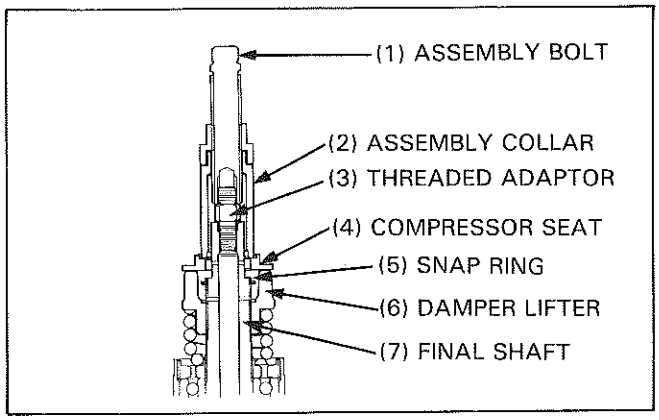
(Except U.S.A.)
Install a attachment or equivalent spacer between the compressor bolt and body.
Set the damper spring compressor onto the damper cam and output drive shaft.
Compress the damper spring by turning the compressor bolt clockwise and install the snap ring.
Remove the compressor.

TOOL:

Damper spring compressor	**07964—ME90000**
Attachment, 32 x 35 mm	**07746—0010100 or equivalent spacer**
Snap ring pliers	**07914—5670100 or equivalent commercially available in U.S.A.**



(U.S.A. only)
Place the snap ring over the final shaft.
Place the threaded adaptor in the end of the final shaft and tighten.
Place the compressor seat over the threaded adaptor with the stepped side facing upward.
Install the assembly bolt thought the assembly collar and attach it to the threaded adaptor.
Center the compressor seat with the damper lifter then begin tighten the 24 mm nut of the collar until the snap ring is visable so it can be installed into the groove in the final shaft.



TOOLS:

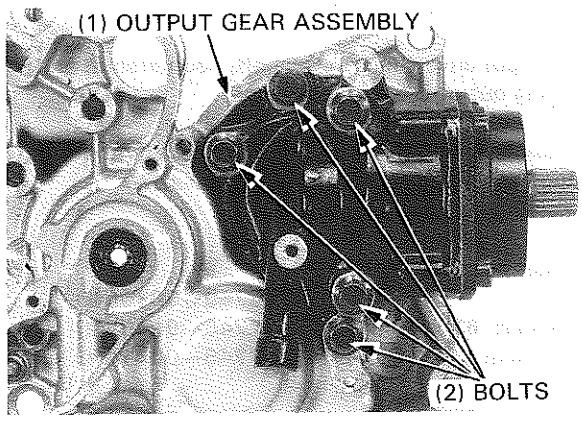
Assembly bolt	**07965—1660200**
Assembly collar	**07965—1660300**
Compressor seat	**07967—9690200**
Threaded adaptor	**07965—KA30000**
Snap ring pliers	**07914—5670100 or equivalent commercially available in U.S.A.**

Install the transmission, final driven gear, bushing and thrust washer.

Assemble the crankcase (page 12-3).

Tighten the three output gear case flange bolts.

TORQUE: 30—34 N·m (3.0—3.4 kg-m, 22—25 ft-lb)



CRANKCASE BEARINGS REPLACEMENT

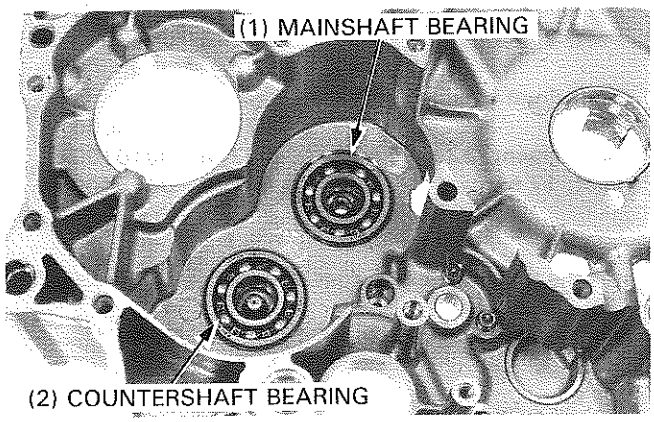
LEFT CRANKCASE BEARING

Separate the crankcase (page 12-2) and remove the crankshaft, transmission, shift drum and output gear assembly.

Heat the left crankcase around the mainshaft and countershaft bearings to 80°C (176°F).

WARNING

- ***Always wear gloves when handling a heated crankcase.***



Remove the mainshaft and countershaft bearings with the following tools.

TOOLS:

Bearing remover set, 20 mm	**07936—3710001**
Bearing remover 20 mm	**07936—3710600**
Remover handle	**07936—3710100**
Remover weight	**07936—3710200 or 07741—0010201**

Drive new bearings into the left crankcase with the following tools.

TOOLS:

Driver	**07749—0010000**
Attachment, 52 x 55 mm	**07746—0010400**

Install the output gear assembly, transmission, shift drum and crankshaft.

RIGHT CRANKCASE BEARING

Separate the crankcase (page 12-2).

Heat the right crankcase around the mainshaft, countershaft, shift drum and output drive shaft bearings to 80°C (176°F).

WARNING

- ***Always wear gloves when handling a heated crankcase.***

Drive the output drive shaft, main shaft, countershaft and shift drum bearing out of the right crankcase.

Drive a new bearing into the right crankcase with its letters side facing outside using the following tools.

TOOLS:

Mainshaft bearing:

Driver	**07749—0010000**
Attachment, 62 x 68 mm	**07746—0010500**
Pilot, 25 mm	**07746—0041100**

Countershaft bearing and output drive shaft bearing:

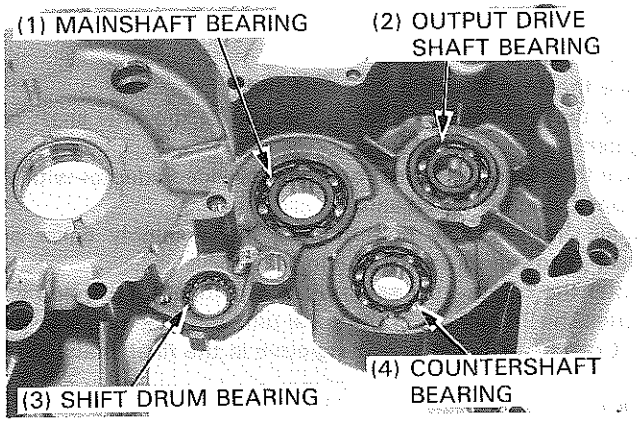
Driver	**07749—0010000**
Attachment, 52 x 55 mm	**07746—0010400**
Pilot, 20 mm	**07746—0040500**

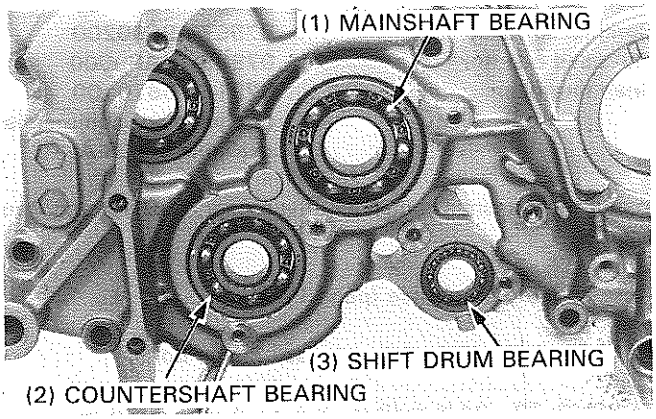
Shift drum bearing:

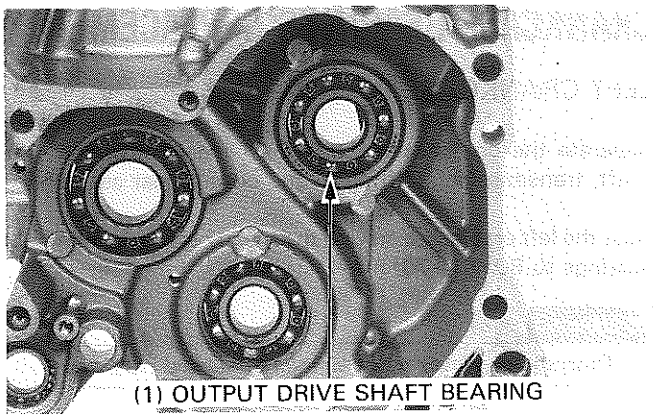
Driver	**07749—0010000**
Attachment, 32 x 35 mm	**07746—0010100**
Pilot, 17 mm	**07746—0040400**

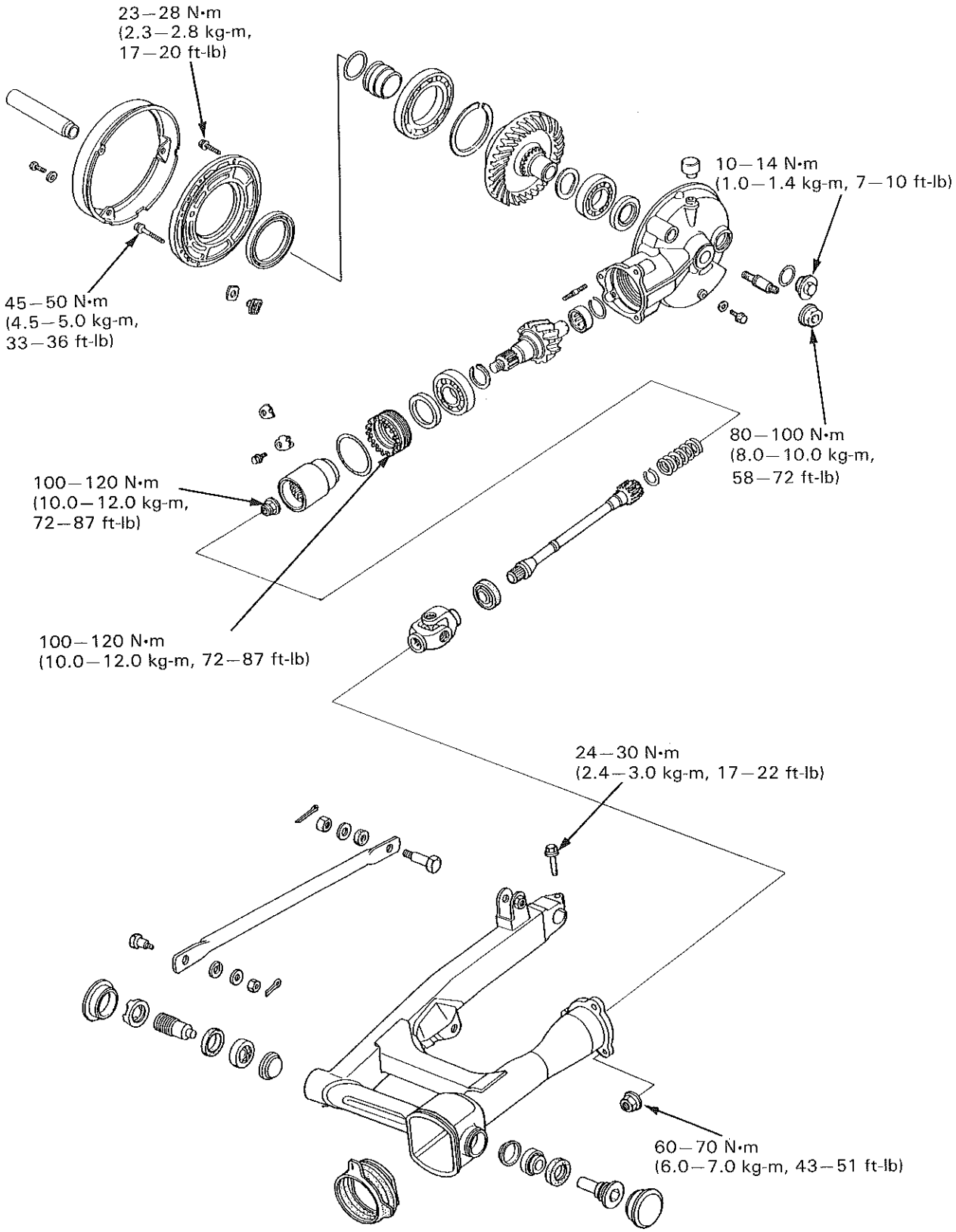
Install the transmission, output drive gear and crankshaft.

Assemble the crankcase (page 12-3).








23–28 N·m
(2.3–2.8 kg-m,
17–20 ft-lb)
10–14 N·m
(1.0–1.4 kg-m, 7–10 ft-lb)
45–50 N·m
(4.5–5.0 kg-m,
33–36 ft-lb)
80–100 N·m
(8.0–10.0 kg-m,
58–72 ft-lb)
100–120 N·m
(10.0–12.0 kg-m,
72–87 ft-lb)
100–120 N·m
(10.0–12.0 kg-m, 72–87 ft-lb)
24–30 N·m
(2.4–3.0 kg-m, 17–22 ft-lb)
60–70 N·m
(6.0–7.0 kg-m, 43–51 ft-lb)

SERVICE INFORMATION

GENERAL

- The final drive gear assembly and drive shaft must be removed together.
- Replace all oil seals and O-rings whenever the final drive gear assembly is disassembled.
- Check the tooth contact pattern and gear backlash when the bearing, gear set and/or gear case have been replaced.

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Final gear oil	Capacity	150 cc (5.1 US oz, 5.3 Imp oz)	—
	Recommended oil	Hypoid-gear oil SAE #80	—
Gear backlash		0.08—0.18 mm (0.003—0.007 in)	0.30 mm (0.012 in)
Gear assembly preload		0.2—0.4 N·m (2—4 kg-cm, 1.7—3.5 in-lb)	—

TORQUE VALUES

Pinion bearing retainer	100—120 N·m (10.0—12.0 kg-m, 72—87 ft-lb)
Pinion nut	100—120 N·m (10.0—12.0 kg-m, 72—87 ft-lb)
Gear case cover bolt 10 mm	45—50 N·m (4.5—5.0 kg-m, 33—36 ft-lb)
8 mm	2.3—2.8 N·m (2.3—2.8 kg-m, 17—20 ft-lb)
Final gear case attaching nut	60—70 N·m (6.0—7.0 kg-m, 43—51 ft-lb)
Rear axle nut	80—100 N·m (8.0—10.0 kg-m, 58—72 ft-lb)
Rear axle pinch bolt	24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)

TOOLS

Special

Pinion joint holder	07926—ME90000
Retainer wrench	07910—ME80000
Pinion puller set	07935—MB00000
Attachment	07945—3330300
Bearing race insert attachment	07931—4630300 — Not available in U.S.A.
Bearing puller & driver attachment	07934—MB00000

Common

Driver	07749—0010000
Attachment, 52 x 55 mm	07746—0010400
Inner driver	07746—0030100
Attachment, 25 mm I. D.	07746—0030200
Attachment, 42 x 47 mm	07746—0010300

TROUBLESHOOTING

Excessive noise

- Worn or scored ring gear shaft and driven flange
- Scored driven flange and wheel hub
- Worn or scored drive pinion and splines
- Worn pinion and ring gears
- Excessive backlash between pinion and ring gear
- Oil level too low

Oil leak

- Clogged breather
- Oil level too high
- Seals damaged

FINAL DRIVE REMOVAL

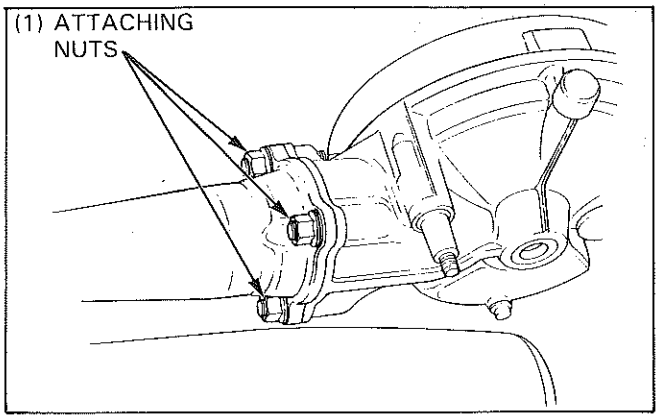
Place the motorcycle on its center stand.

Drain the final gear oil (page 2-8).

Loosen the final gear case attaching nuts.

Remove the rear wheel (page 16-3) and the left shock absorber (page 16-9).

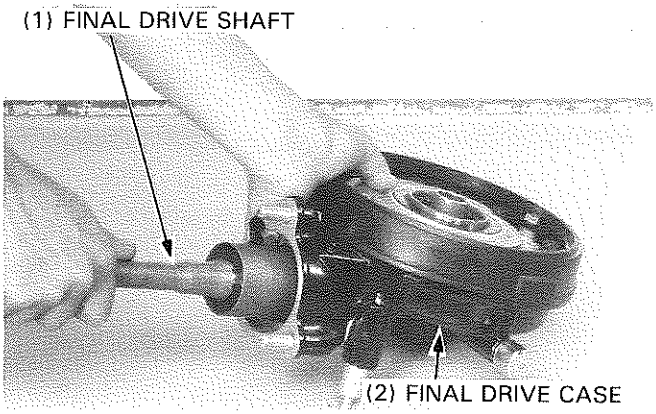
Remove the attaching nuts and the final gear case.



DRIVE SHAFT

REMOVAL

Separate the drive shaft from the gear case by gently pulling on the drive shaft, while moving it in a circular pattern.



DISASSEMBLY/ASSEMBLY

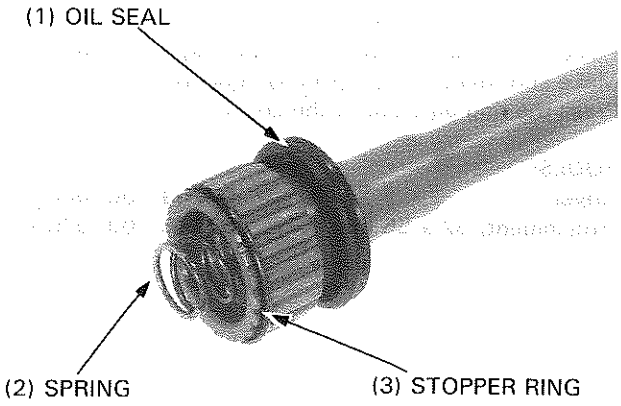
Remove the spring, oil seal and stop ring from the drive shaft.

NOTE

- Replace the oil seal with a new one if it is removed.

Place a new oil seal over the drive shaft.

Install the damper spring and new stop ring.



UNIVERSAL JOINT

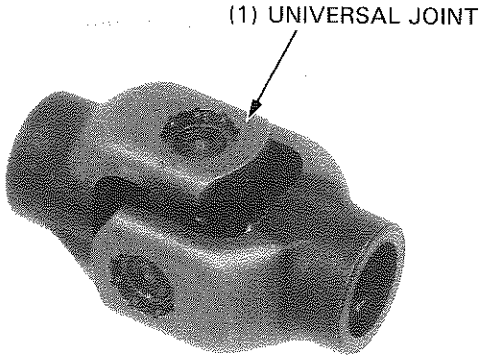
REMOVAL/INSTALLATION

Remove the swingarm (page 16-10).

Remove the universal joint from the engine output driven shaft.

Inspect the universal joint bearings for excessive play or damage.

Apply grease to the splines and install the universal joint.

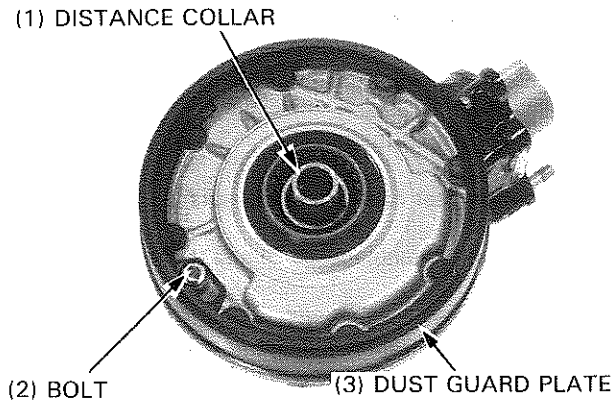


FINAL DRIVE GEAR

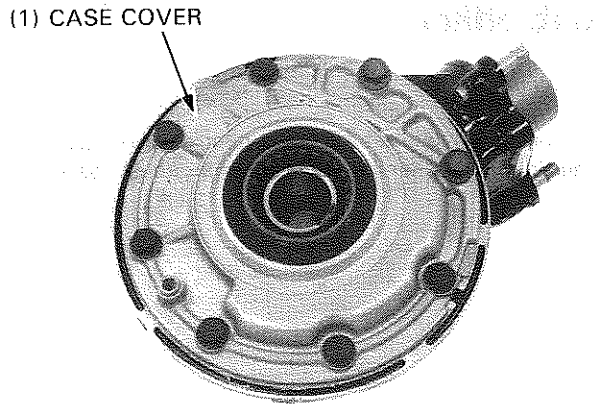
RING GEAR REMOVAL

Remove the distance collar.

Remove the dust guard plate bolts.
Remove the dust guard plate by turning it clockwise.



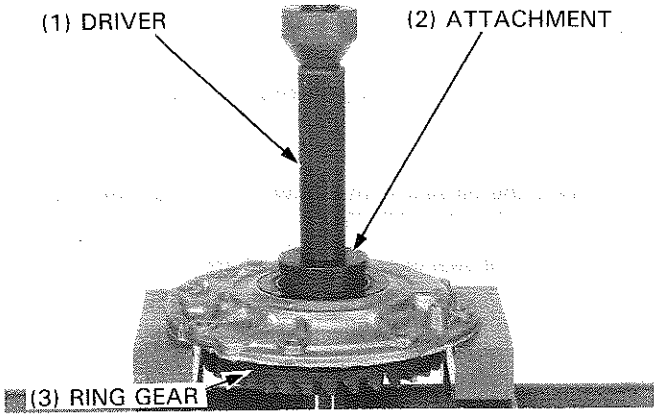
Remove the eight case cover bolts and cover.



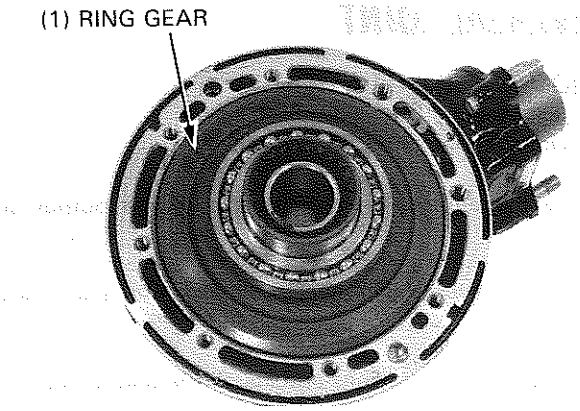
If the ring gear stays in the cover, do the following:
Place the cover in a press with the ring gear down.
Make sure the cover is securely supported.
Press the ring gear out of the cover.

TOOLS:

Driver	**07749–0010000**
Attachment, 52 x 55 mm	**07746–0010400**



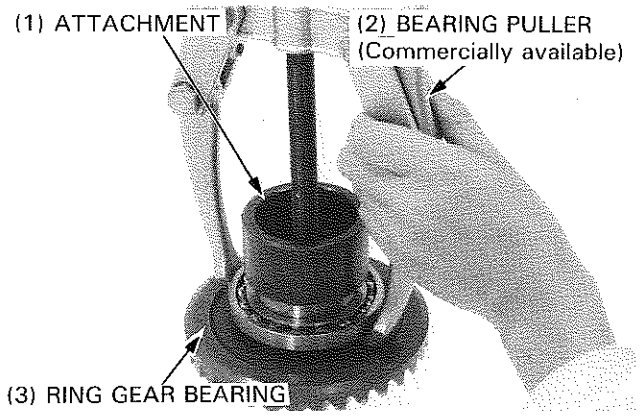
Remove the ring gear from the final drive case.



RING GEAR BEARING/O-RING GUIDE REMOVAL

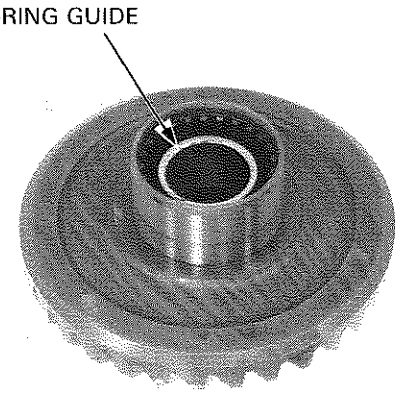
Remove the ring gear bearing and gear adjusting spacer.

TOOL:
Bearing puller & driver attachment **07934—MB00000**



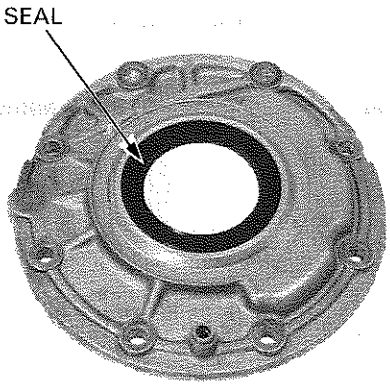
Remove the O-ring guide by tapping it from the opposite side.

If the ring gear bearing stays in the cover, carefully drive it out.



CASE COVER OIL SEAL REPLACEMENT

Remove the oil seal from the case cover and press in a new oil seal.

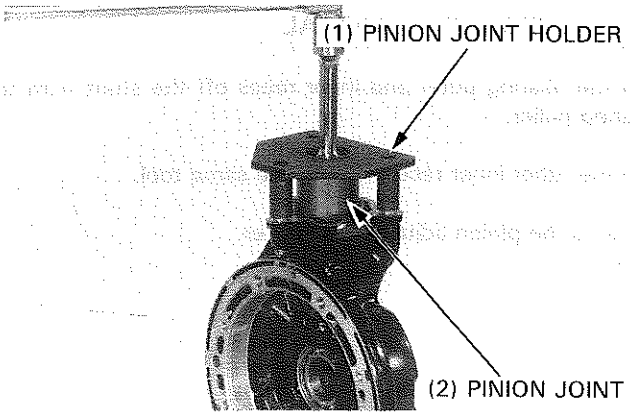


PINION GEAR REMOVAL

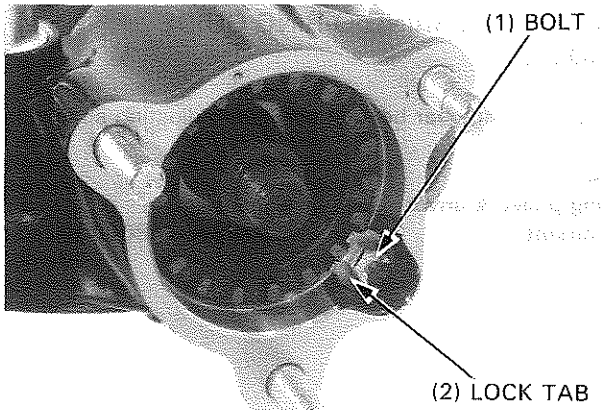
Install the pinion joint holder and remove the pinion shaft nut.

TOOL:
Pinion joint holder **07926—ME90000**

Remove the tool and pinion joint.



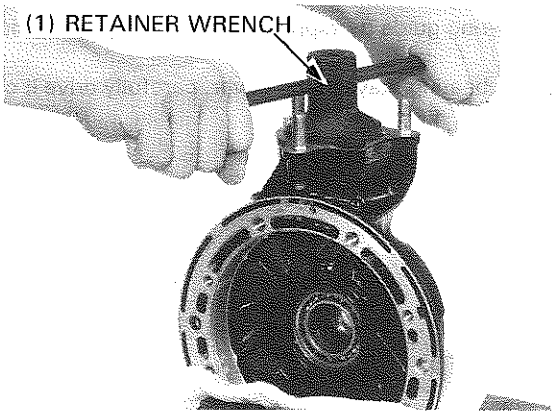
Remove the retainer lock tab.



Remove the pinion retainer with the pinion retainer wrench.

TOOL:

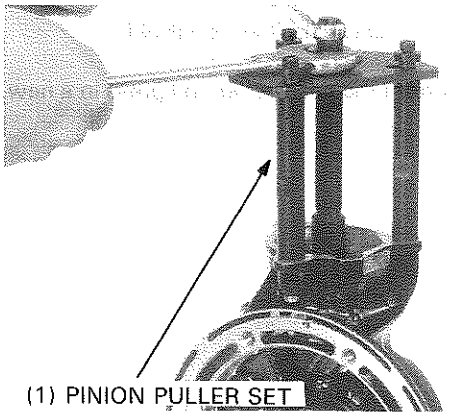
Retainer wrench	**07910—ME80000**



Pull the pinion assembly off with the pinion puller.

TOOL:

Pinion puller set	**07935—MB00000**

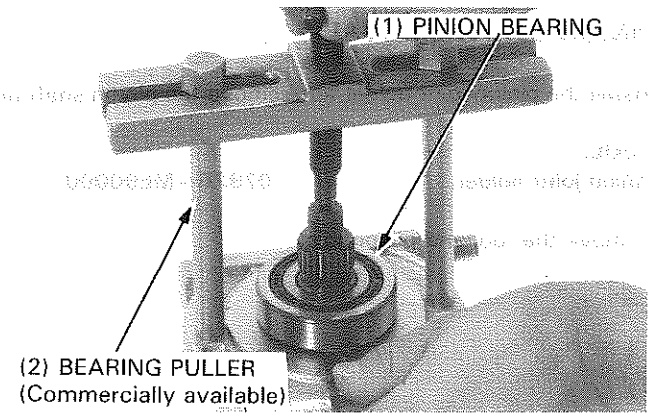


PINION BEARING REMOVAL

Pull the bearing outer and inner races off the shaft with the bearing puller.

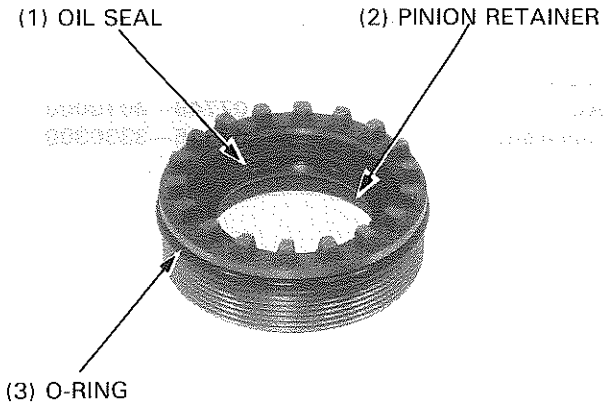
Pull the other inner race off with the same tool.

Remove the pinion adjustment spacer.



PINION RETAINER OIL SEAL REPLACEMENT

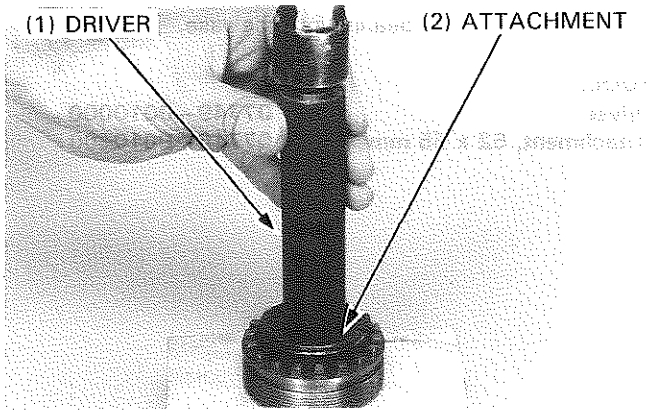
Remove the O-ring and oil seal from the pinion retainer.



Drive a new oil seal into the retainer.

TOOLS:

Driver	**07749–0010000**
Attachment	**07945–3330300**



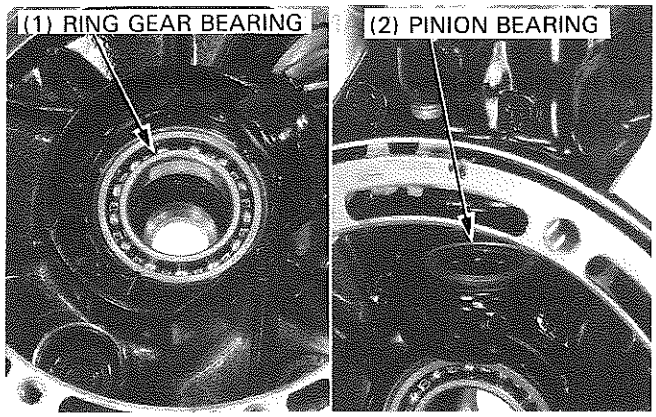
Coat a new O-ring with oil and install it on the retainer.

CASE BEARING AND OIL SEAL REPLACEMENT

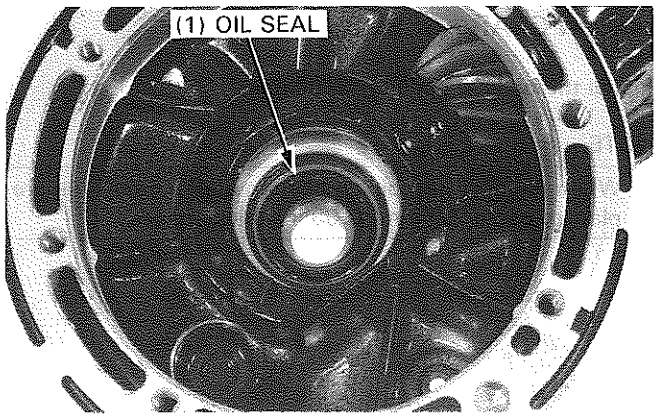
Heat the gear case to 80°C (176°F). Tap the gear case with a plastic hammer and remove the ring gear and pinion bearings.

WARNING

- ***Always wear gloves when handling the gear case after it has been heated.***



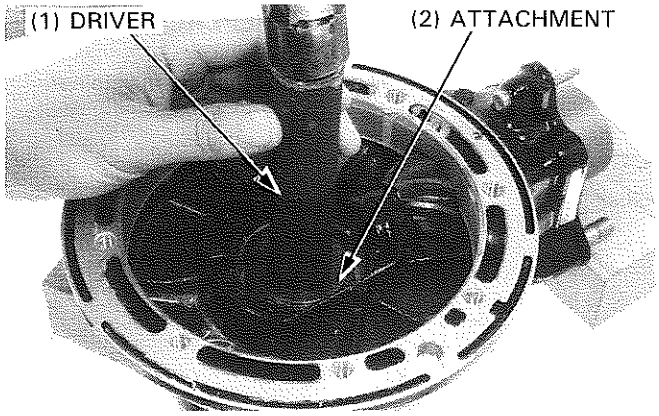
Remove the ring gear shaft oil seal.



Drive a new oil seal into the case.

TOOLS:

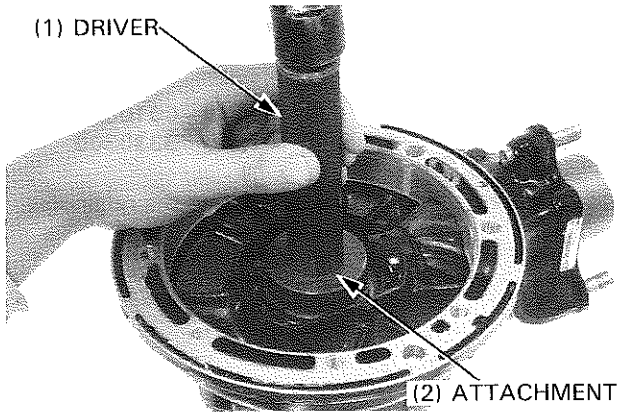
Driver	**07749—0010000**
Attachment	**07945—3330300**



Drive a new ring gear bearing into the case.

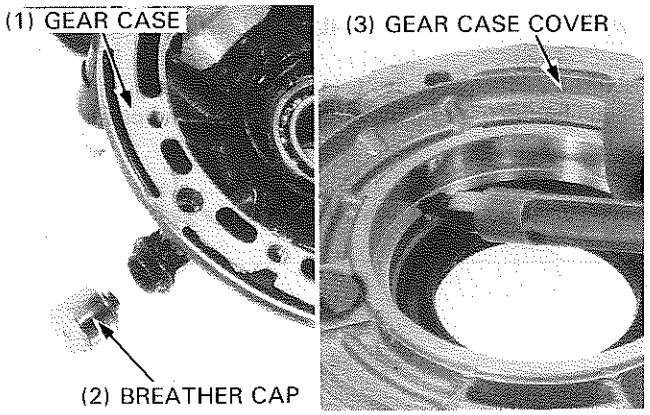
TOOL:

Driver	**07749—0010000**
Attachment, 52 x 55 mm	**07746—0010400**



BREATHER HOLE CLEANING

Remove the breather hole cap and blow compressed air through the breather hole.

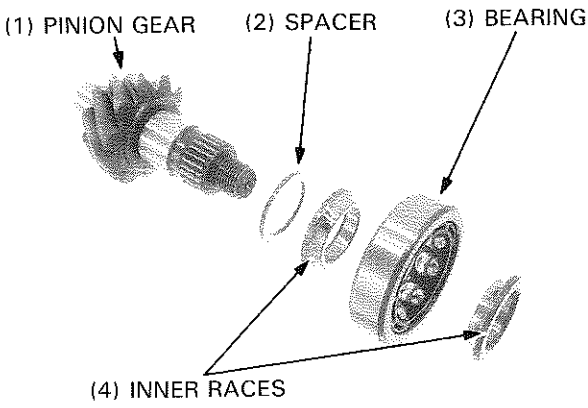


PINION GEAR ASSEMBLY

Install the original pinion gear spacer.

NOTE

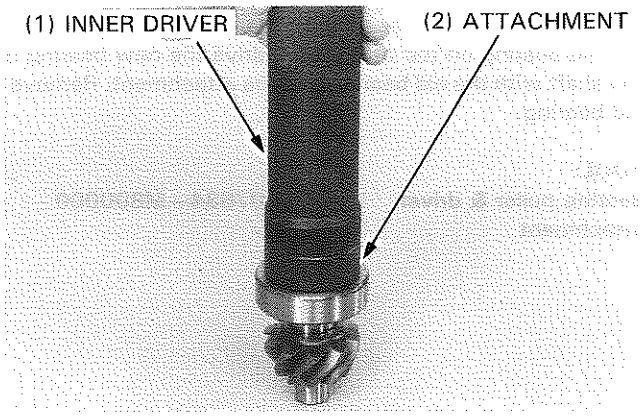
- When the gear set, pinion bearing and/or gear case are replaced, use a 2.0 mm (0.08 in) thick spacer.



Press the pinion bearing onto the shaft until it seats. Press only on the inner race.

TOOLS:

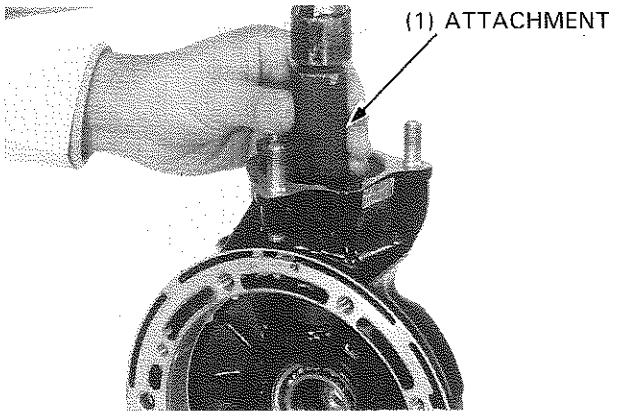
Inner driver	**07746—0030100**
Attachment, 25 mm I.D.	**07746—0030200**



Place the pinion assembly into the gear case and drive it until enough threads are visible to engage the pinion retainer.

TOOL:

Bearing race insert attachment	**07931—4630300**
	Not available in U.S.A.



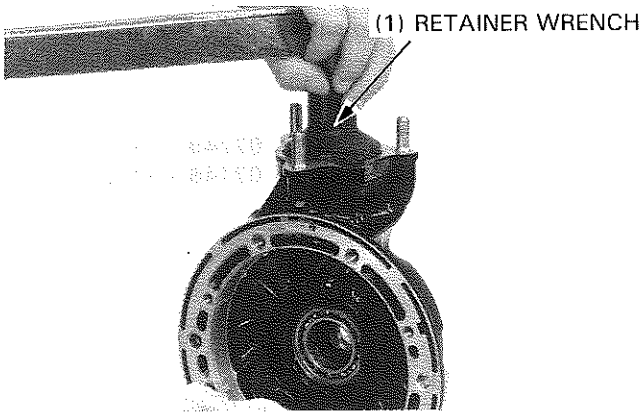
Coat the O-ring and threads on the pinion retainer with gear oil.

Screw the pinion retainer in, pressing the pinion bearing in place, then tighten to the specified torque.

TORQUE: 100—120 N·m (10.0—12.0 kg-m, 72—87 ft-lb)

TOOL:

Pinion retainer wrench	**07910—ME80000**

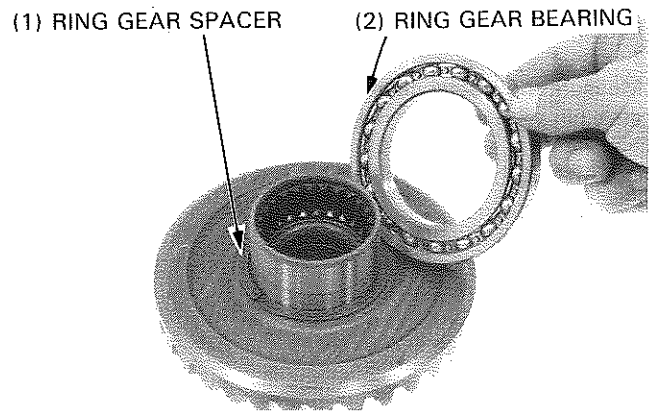


RING GEAR ASSEMBLY

Install the original spacer onto the ring gear.

NOTE

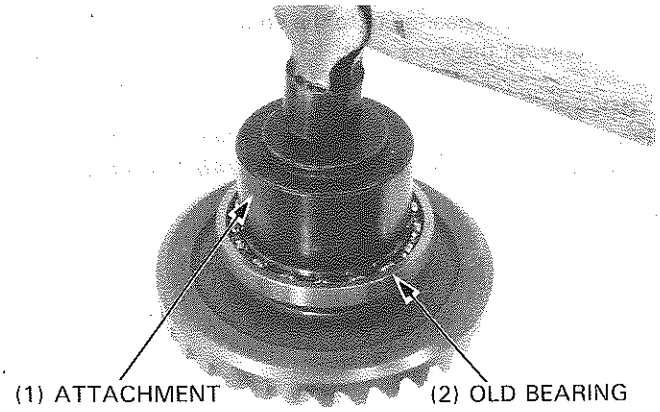
- If the gear set, pinion bearing, ring gear bearing and/or gear case are replaced, install a 2.0 mm (0.08 in) thick spacer.



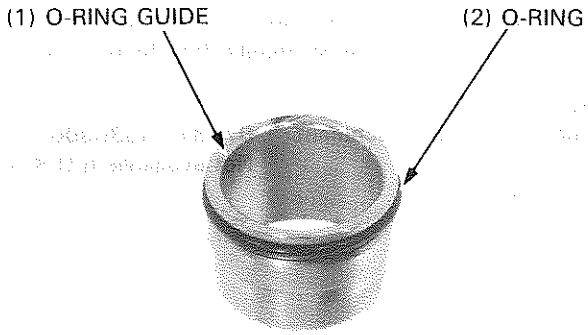
Place a new ring gear bearing on the ring gear shaft and place the old bearing on top of it. Then, drive the new bearing onto the shaft with the old bearing and the attachment. Remove the old bearing.

TOOL:

Bearing puller & driver attachment	**07934—MB00000**



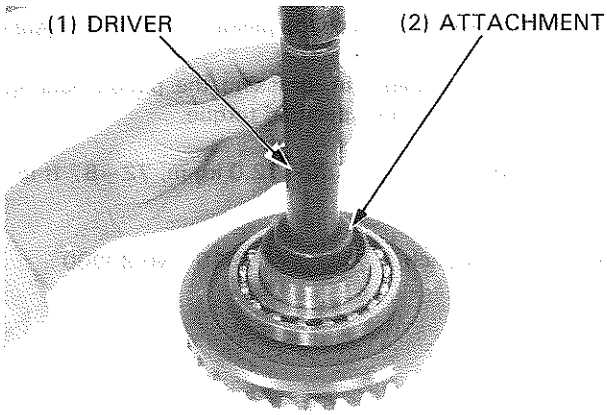
Install a new O-ring on the O-ring guide.



Apply grease to the O-ring and drive the O-ring guide into the ring gear shaft.

TOOLS:

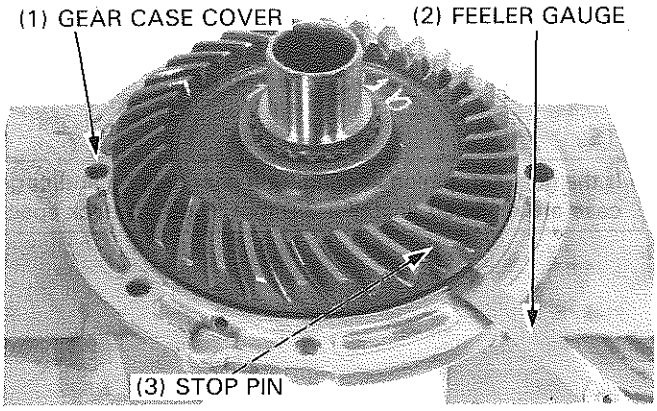
Driver	**07749—0010000**
Attachment, 42 x 47 mm	**07746—0010300**



Install the ring gear into the gear case cover.

Measure the clearance between the ring gear and the ring gear stop pin with a feeler gauge.

CLEARANCE: 0.30—0.60 mm (0.012—0.024 in)



Remove the ring gear. If the clearance exceeds the service limit, heat the gear case cover to approximately 80°C (176°F) and remove the stop pin by tapping the cover.

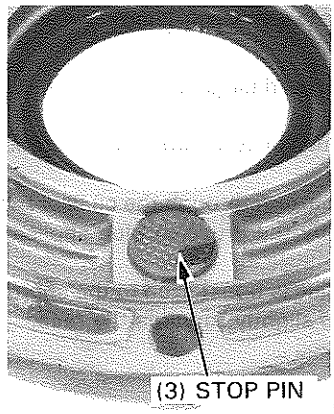
WARNING

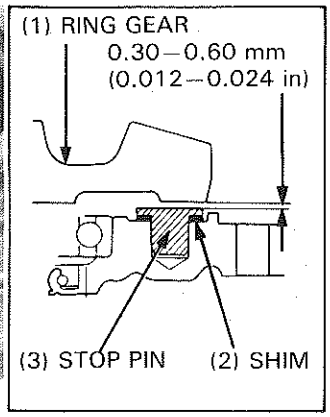
- ***Always wear gloves when handling the gear case after it has been heated.***

Install a stop pin shim to obtain the correct clearance.

SHIM THICKNESS: A: 0.10 mm (0.004 in)
B: 0.15 mm (0.006 in)

Install the shim and drive the stop pin into the case cover.



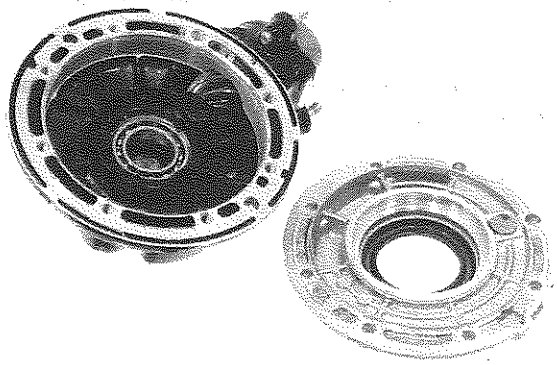


Clean all sealing material off the mating surfaces of the gear case and cover.

NOTE

- Keep dust and dirt out of the gear case.
- Be careful not to damage the mating surfaces.

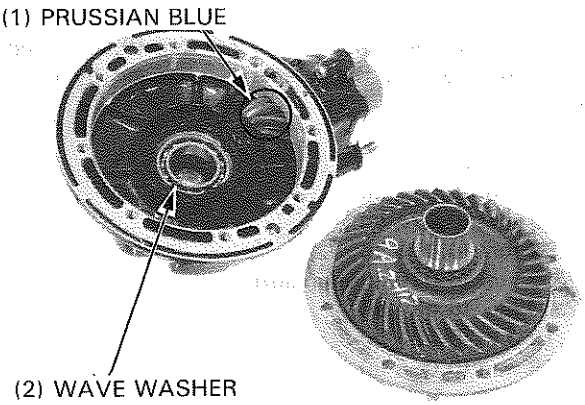
Apply liquid sealant to the mating surface of the gear case cover.



GEAR TOOTH CONTACT PATTERN CHECK

Apply a thin coat of Prussian Blue to the pinion gear teeth for a contact pattern check.
Place the wave washer and ring gear into the gear case.

Coat the lip of the gear case cover seal with oil and install the gear case cover.

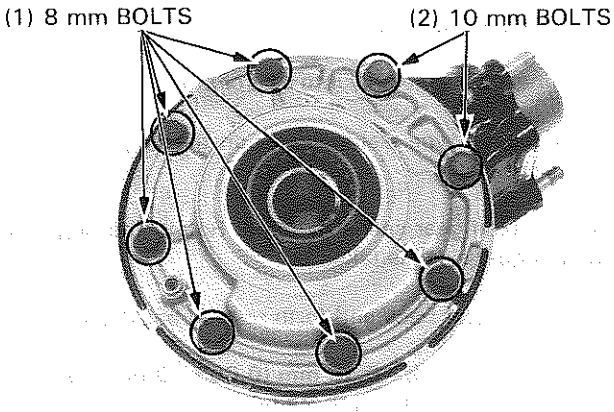


Tighten the cover bolts in 2–3 steps until the cover evenly touches the gear case, then tighten the 8 mm bolts to the specified torque in a crisscross pattern in two or more steps.

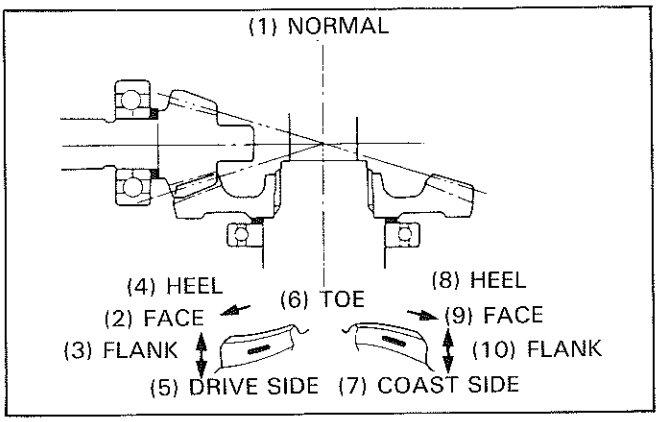
TORQUE: 23–28 N·m (2.3–2.8 kg-m, 17–20 ft-lb)

Then tighten the 10 mm bolts.

TORQUE: 45–50 N·m (4.5–5.0 kg-m, 33–36 ft-lb)



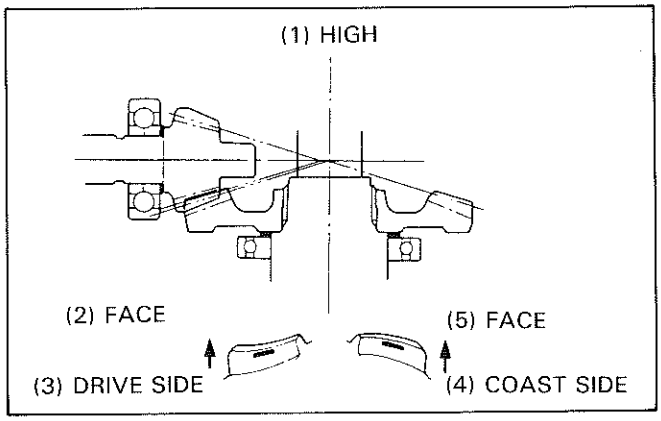
GEAR TOOTH CONTACT PATTERN CHECK



Remove the oil filler cap from the final gear case.

Rotate the ring gear several times in both direction of rotation.

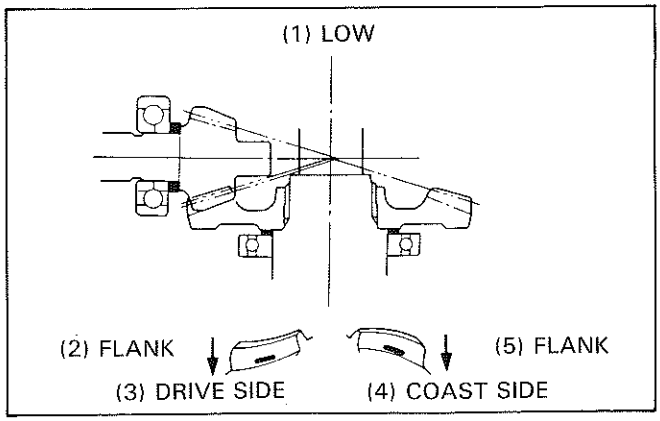
Check the gear tooth contact pattern through the oil filler hole. The pattern will be indicated by the Prussian Blue applied to the pinion before assembly.
Contact is normal if Prussian Blue is transferred to the approximate center of each tooth and slightly towards the face.



If the patterns are not correct, remove and change the pinion spacer.

Replace the pinion spacer with a thicker one if the contact patterns are too high.

Replace the pinion spacer with a thinner one if the contact patterns are too low.

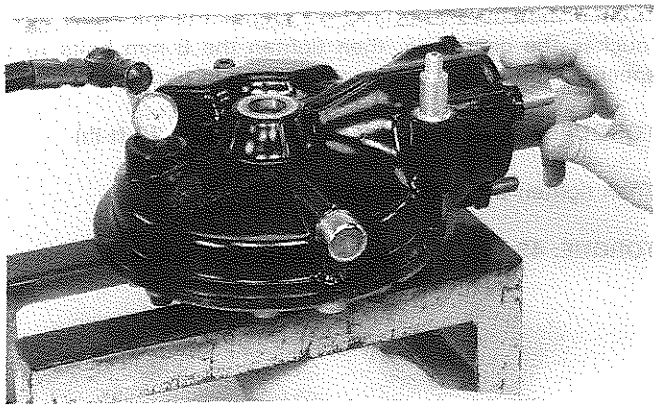


The patterns will shift about 1.5—2.0 mm (0.06—0.08 in) when the thickness of the spacer is changed by 0.1 mm (0.004 in).

PINION SPACER:
- **A: 1.82 mm (0.072 in)**
- **B: 1.88 mm (0.074 in)**
- **C: 1.94 mm (0.076 in)**
- **D: 2.00 mm (0.079 in) standard**
- **E: 2.06 mm (0.081 in)**
- **F: 2.12 mm (0.083 in)**
- **G: 2.18 mm (0.086 in)**

BACKLASH INSPECTION

Remove the oil filler cap.



Set the final gear assembly into a jig or stand to hold it steady.

Set a horizontal type dial indicator on the ring gear, through the oil filler hole.

Hold the pinion gear spline by hand. Rotate the ring gear by hand until gear slack is taken up.

Turn the ring gear back and forth to read backlash.

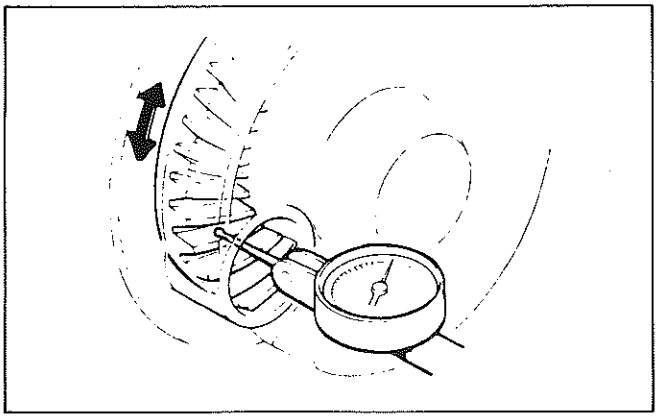
STANDARD: 0.08—0.18 mm (0.003—0.007 in)
SERVICE LIMIT: 0.30 mm (0.02 in)

Remove the dial indicator. Turn the ring gear 120° and measure backlash. Repeat this procedure once more.

Compare the difference between the three measurements.

DIFFERENCE BETWEEN MEASUREMENTS
SERVICE LIMIT: 0.10 mm (0.004 in)

If the difference in measurements exceeds the limit, it indicates that the bearing is not installed squarely.
Inspect the bearings and reinstall if necessary.

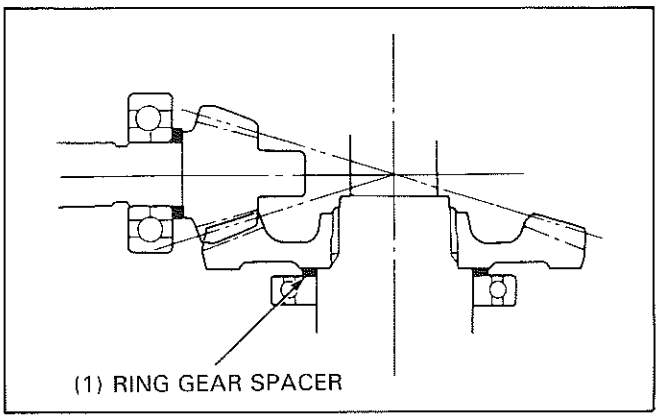


If backlash is excessive, replace the ring gear spacer with a thicker one.

If the backlash is too small, replace the ring gear spacer with a thinner one.

Backlash is changed by about 0.06—0.07 mm (0.002—0.003 in) when the thickness of the spacer is changed by 0.10 mm (0.004 in).

RING GEAR SPACER:
- **A: 1.82 mm (0.072 in)**
- **B: 1.88 mm (0.074 in)**
- **C: 1.94 mm (0.076 in)**
- **D: 2.00 mm (0.079 in) standard**
- **E: 2.06 mm (0.081 in)**
- **F: 2.12 mm (0.083 in)**
- **G: 2.18 mm (0.086 in)**
- **H: 2.24 mm (0.088 in)**
- **I: 2.30 mm (0.091 in)**

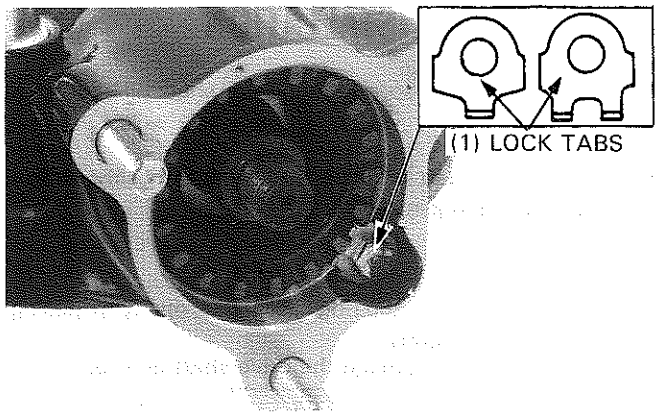


PINION JOINT INSTALLATION

Install the appropriate pinion lock tab.

NOTE

- There are two types of lock tabs as shown.



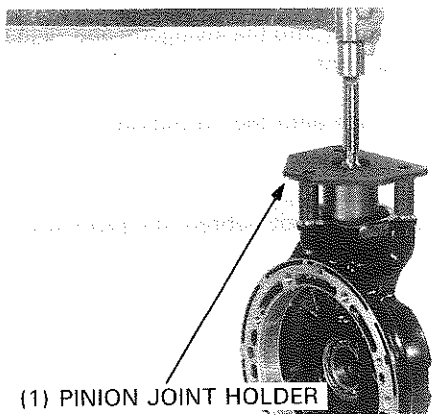
Coat the oil seal lip contact surface of the pinion joint with oil and install the pinion joint.

Install the pinion joint holder tool and tighten the pinion nut.

TORQUE: 100—120 N·m (10.0—12.0 kg-m, 72—87 ft-lb)

TOOL:
Pinion joint holder **07926—ME90000**

Remove the pinion joint holder tool.

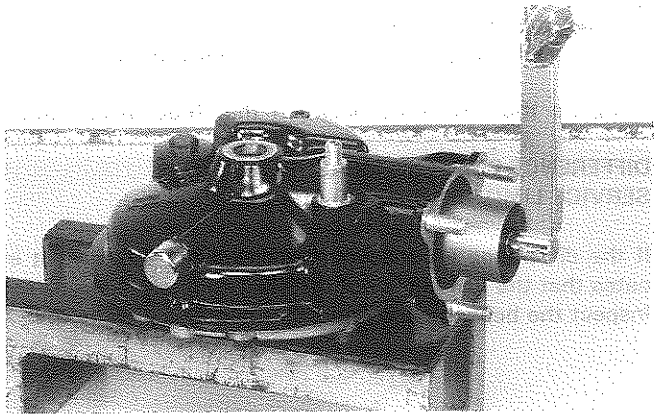


Make sure that the gear assembly rotates smoothly without binding.

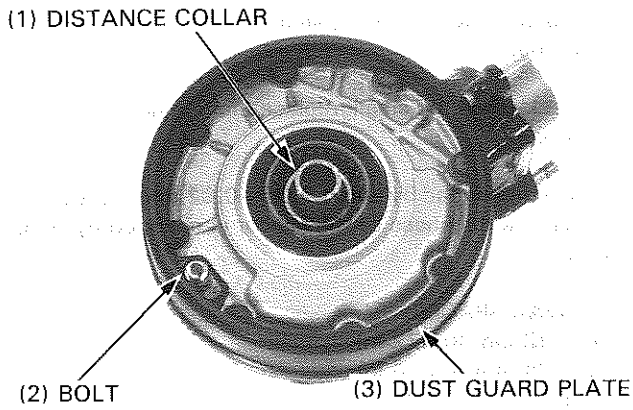
Measure the final gear assembly preload.

PRELOAD: 0.2—0.4 N·m (2—4 kg-cm, 1.7—3.5 in-lb)

If the preload reading does not fall within the limit, disassemble the final gear and check the bearings for proper installation.



Install the dust guard plate and torque the bolts.
Install the distance collar.



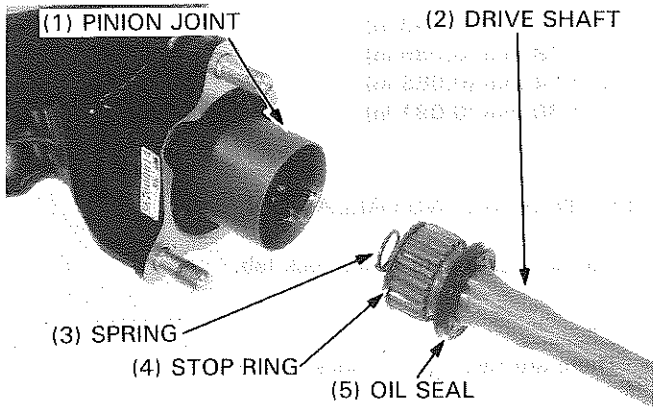
FINAL DRIVE INSTALLATION

Coat the pinion joint splines and drive shaft oil seal lip with grease.

Insert the drive shaft into the pinion joint until the stop ring seats in the pinion joint spline grooves.

NOTE

- Make sure that the stop ring is seated properly by pulling on the drive shaft lightly.
- Be careful not to damage the drive shaft oil seal.

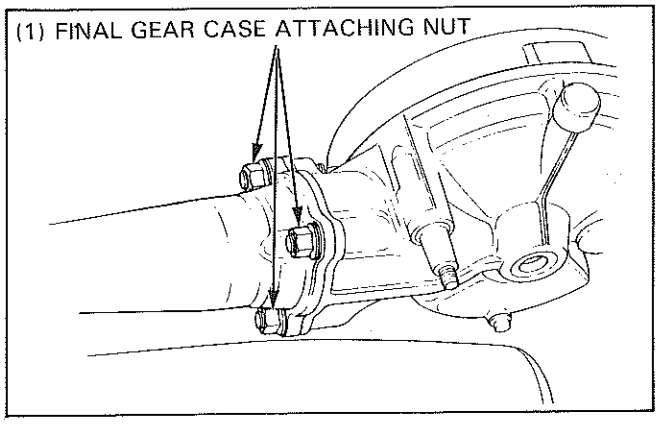


Insert the drive shaft assembly into the swingarm and align the splines with the universal joint.

Loosely attach the gear case onto the swingarm.

NOTE

- To ease axle installation, do not tighten the gear case nuts until after the axle is installed.



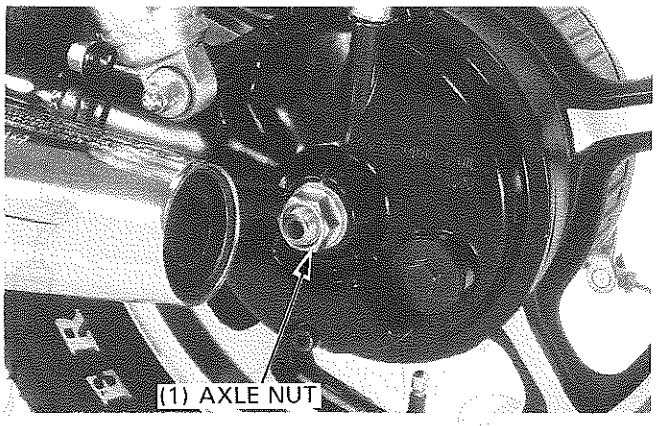
Install the rear wheel (page 16-6).

Tighten the axle nut.

TORQUE: 80—100 N·m (8.0—10.0 kg-m, 58—72 ft-lb)

Tighten the three final gear case attaching nuts.

TORQUE: 60—70 N·m (6.0—7.0 kg-m, 43—51 ft-lb)



Tighten the axle pinch bolt.

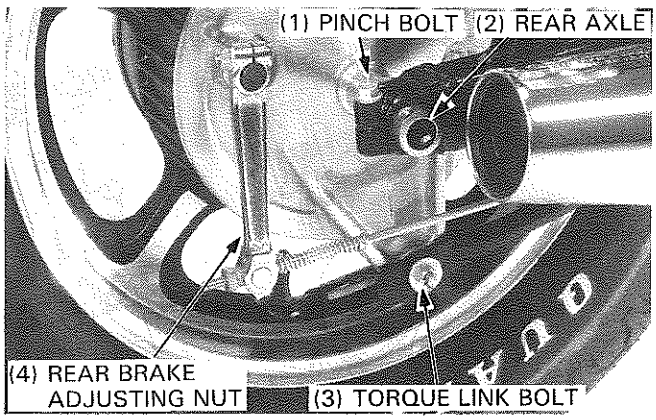
TORQUE: 24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)

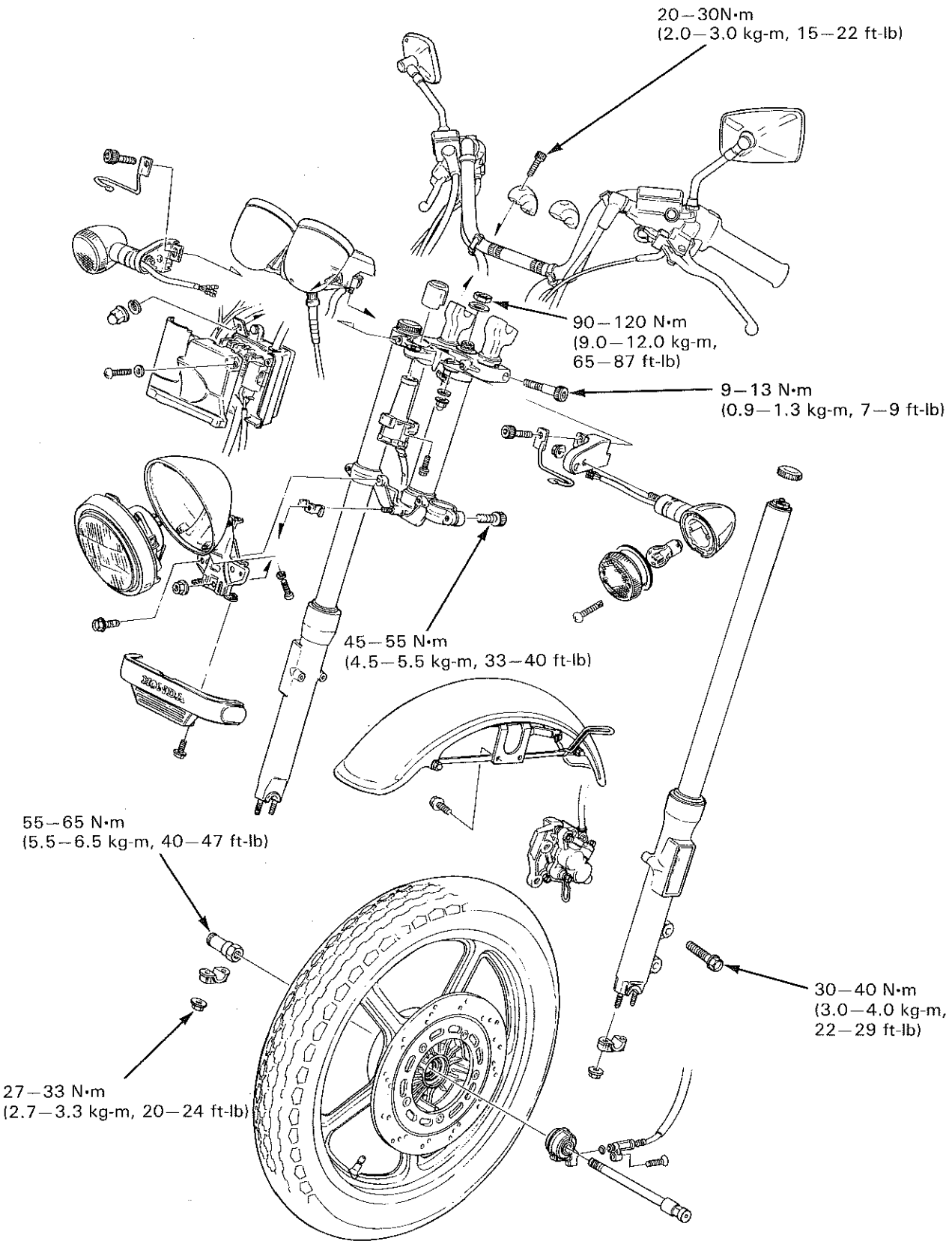
Install the left rear shock absorber (page 16-10).

Make sure that the drain bolt is tightened.

Remove the oil filler cap and fill the case with the proper amount of recommended oil.

RECOMMENDED OIL: HYPOID GEAR OIL SAE #80
OIL CAPACITY: 150 cc (5.1 oz, 5.3 Imp oz)




20–30N·m
(2.0–3.0 kg-m, 15–22 ft-lb)
90–120 N·m
(9.0–12.0 kg-m,
65–87 ft-lb)
9–13 N·m
(0.9–1.3 kg-m, 7–9 ft-lb)
45–55 N·m
(4.5–5.5 kg-m, 33–40 ft-lb)
55–65 N·m
(5.5–6.5 kg-m, 40–47 ft-lb)
30–40 N·m
(3.0–4.0 kg-m,
22–29 ft-lb)
27–33 N·m
(2.7–3.3 kg-m, 20–24 ft-lb)

15. FRONT WHEEL/SUSPENSION

SERVICE INFORMATION

GENERAL

- A jack or other support is required to support the motocycle during front end service.
- For front brake service, refer to section 17.
- For headlight, instrument and ignition switch services and inspections, refer to section 21.

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Axle shaft runout		—	0.2 (0.01)
Front wheel rim runout	Radial	0.3 (0.01) max.	2.0 (0.08)
	Axial	0.03 (0.001) max.	2.0 (0.08)
Fork spring free length		426.2 (16.78)	417.7 (16.44)
Fork tube runout		—	0.2 (0.01)
Front fork fluid capacity		442.5—447.5 cc (14.99—15.16 US oz, 15.59—15.77 Imp oz)	—
Front fork fluid level		134 (5.3)	—
Front fork air pressure		0—40 kpa (0—0.4 kg/cm^2, 0—6 psi)	—
Steering bearing preload		1.1—1.6 kg (2.4—3.5 lb)	—

TORQUE VALUES

Handlebar upper holder bolt	20—30 N·m (2.0—3.0 kg-m, 14—22 ft-lb)
Brake disc bolt	37—43 N·m (3.7—4.3 kg-m, 27—31 ft-lb) Apply oil or grease to the thread.
Front axle nut	55—65 N·m (5.5—6.5 kg-m, 40—47 ft-lb)
Front axle holder nut	27—33 N·m (2.7—3.3 kg-m, 20—24 ft-lb)
Capliper bracket bolt	30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)
Fork socket bolt	15—25 N·m (1.5—2.5 kg-m, 11—18 ft-lb)
Fork tube cap	15—30 N·m (1.5—3.0 kg-m, 11—22 ft-lb)
Front fork top pinch bolt	9—13 N·m (0.9—1.3 kg-m, 7—9 ft-lb)
Front fork bottom pinch bolt	45—55 N·m (4.5—5.5 kg-m, 33—40 ft-lb) Apply oil to the thread.
Steering bearing adjustment nut	23—27 N·m (2.3—2.7 kg-m, 17—20 ft-lb)
Steering stem nut	90—120 N·m (9.0—12.0 kg-m, 65—87 ft-lb)
Master cylinder holder bolt	10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

TOOLS

Special

Fork seal driver	07947—4630100
Steering stem socket	07916—3710100
Steering stem driver	07946—MB00000
Ball race remover	07953—MJ10000 or 07953—MJ10000A (U.S.A. only)
Ball race remover attachment	07946—3710500
Ball race remover	07953—4250002

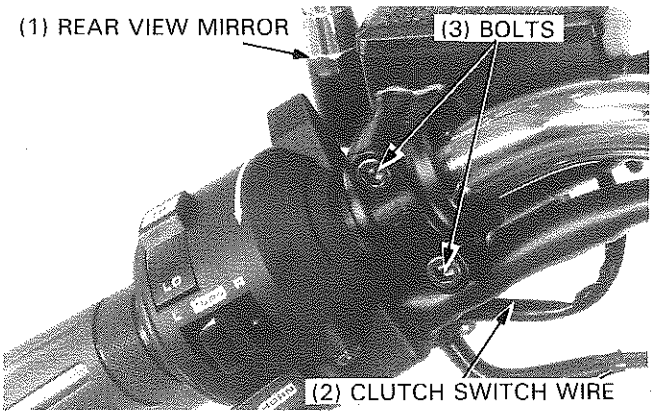
Common

Bearing remover shaft	07746—0050100 — or equivalent commercially available in U.S.A.
Bearing remover head, 15 mm	07746—0050400 —
Driver	07749—0010000
Attachment, 42 x 47 mm	07746—0010300
Pilot, 15 mm	07746—0040300
Extension	07716—0020500 — or equivalent commercially available in U.S.A.
Lock nut wrench, 30 x 32 mm	07716—0020400 —
Attachment, 52 x 55 mm	07746—0010400

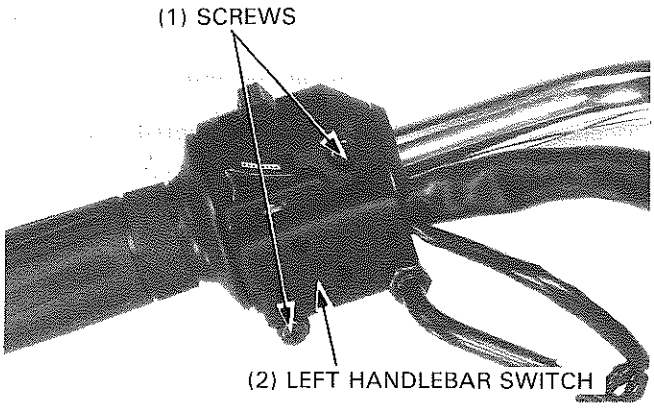
HANDLEBAR

REMOVAL

Remove the handlebar switch wire bands.
Disconnect the clutch switch wires and remove the clutch master cylinder from the handlebar.

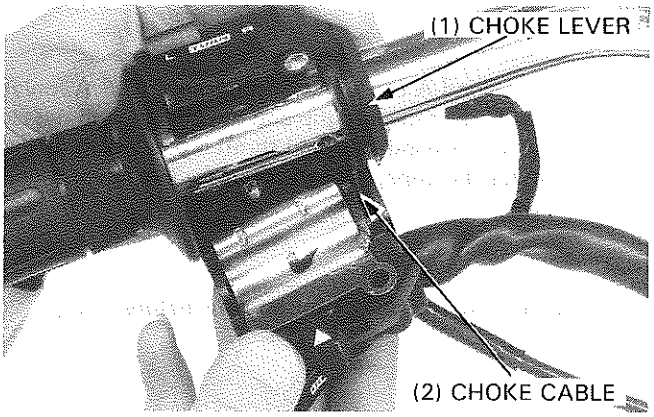


Remove the left handlebar switch attaching screws.

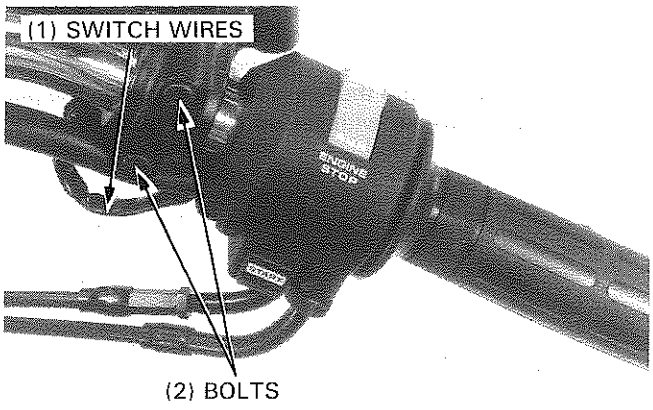


Disconnect the choke cable from the lever and remove the left handlebar switch from the handlebar.

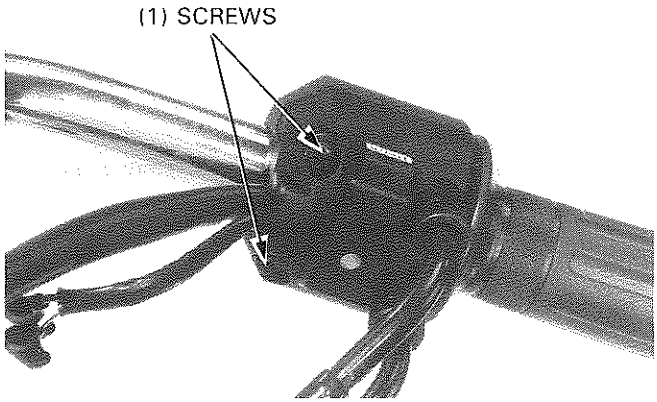
Remove the left handle grip and choke lever from the handlebar.



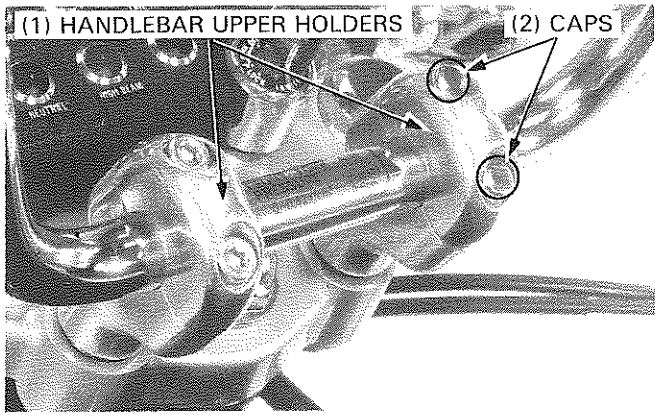
Disconnect the front brake light switch wires from the switch and remove the front brake master cylinder from the handlebar.



Remove the right handlebar switch attaching screws.



Remove the handlebar upper holder then remove the handlebar.
Remove the throttle grip and right handlebar switch from the handlebar.
Disconnect the throttle cable from the throttle grip.

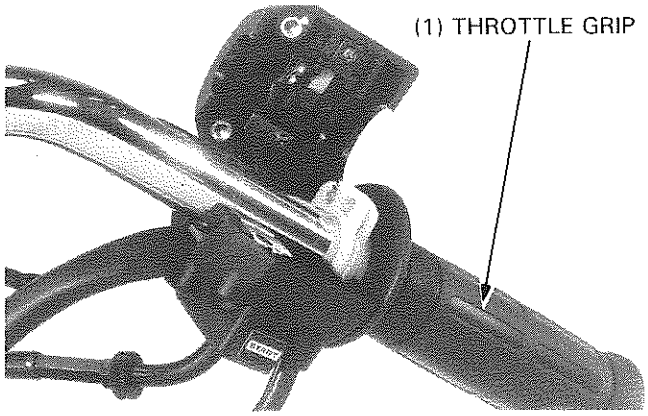


INSTALLATION

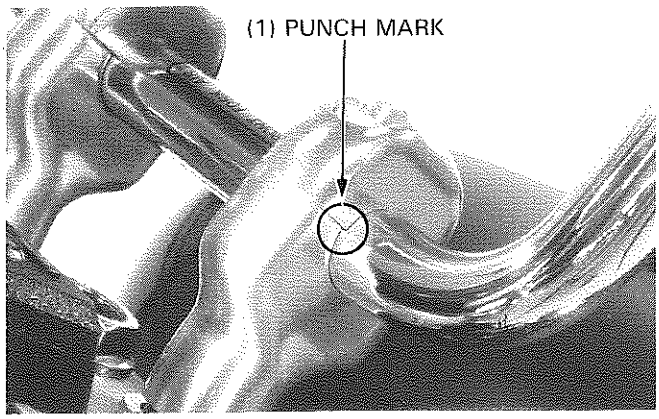
Apply Honda Bond A or Honda Grip Cement (U.S.A. only) to the inside surface of the left grip and throttle grips to the clean surface of the left handlebar and throttle pipe. Wait 3-5 minutes and install the grips. Rote the grips for even application of the adhesive.

NOTE

- Allow the adhesive to dry for an hour before using.



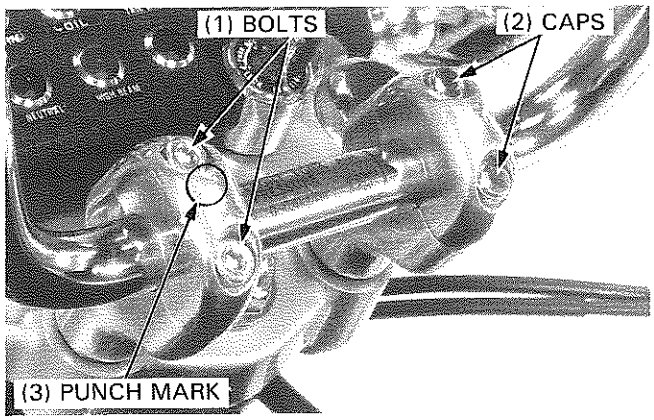
Connect the throttle cables to the throttle grip, clean the throttle grip sliding surface and slide it over the handlebar.
Place the handlebar onto the lower holder and align the punch marks on the handlebar with the upper surfaces of the lower holders.



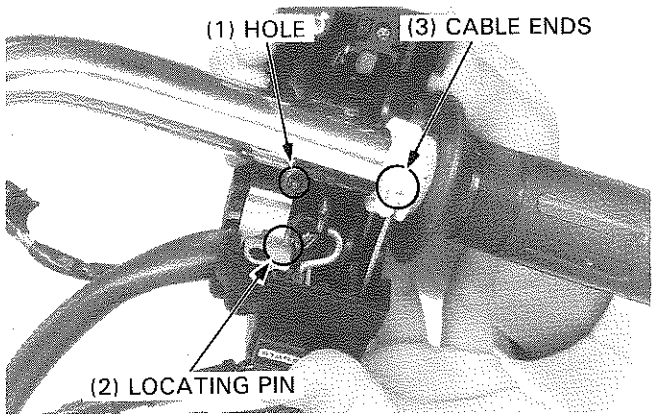
Install the upper holder with its punch mark facing forward, tighten the forward bolts first, then tighten the rear bolts.

TORQUE: 20—30 N·m (2.0—3.0 kg-m, 15—22 ft-lb)

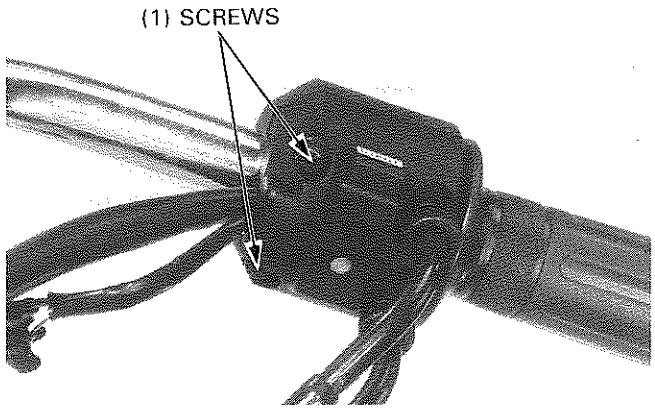
Install the caps into the bolts.



Apply grease to the throttle cable ends.
Install the right handlebar switch onto the handlebar, aligning the locating pin with the hole in the handlebar.



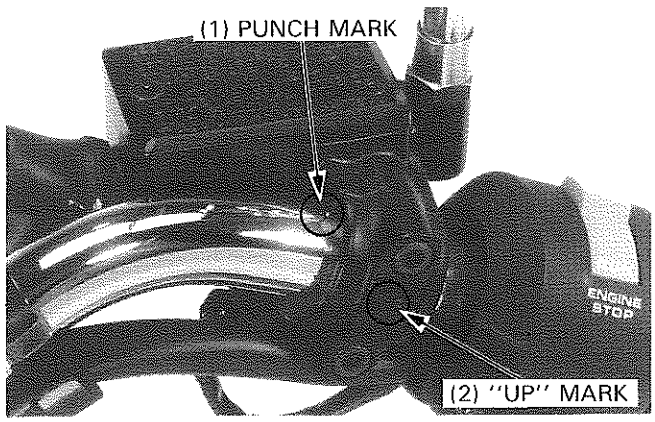
Install the right handlebar switch attaching screws, and tighten the forward screw first, then tighten the rear screw.



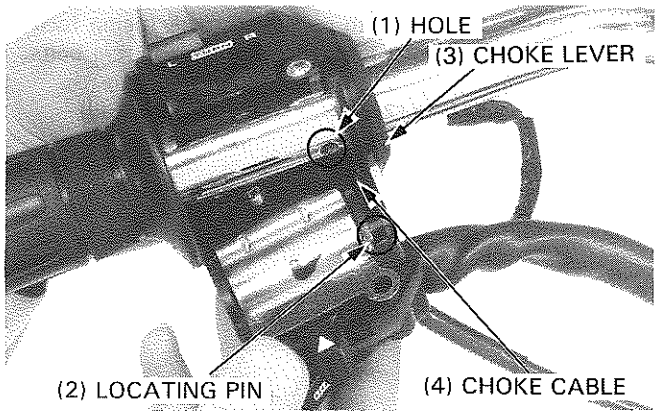
Install the front brake master cylinder and the holder with the "UP" mark facing up.
Align the end of the holder with the punch mark on the handlebar and tighten the upper bolt first then tighten the lower bolt.

TORQUE: 10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

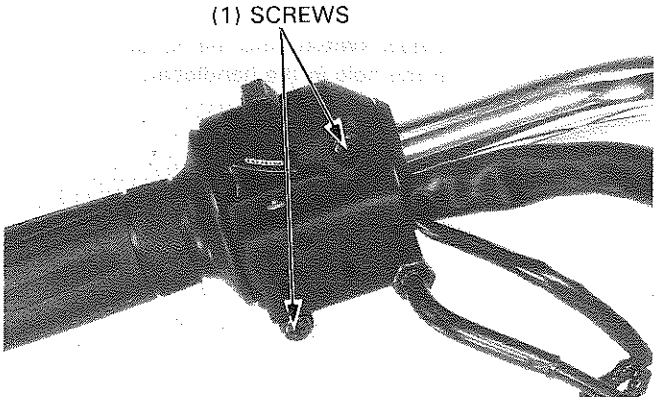
Connect the front brake light switch wires.



Apply grease to the choke cable end and connect the choke cable to the choke lever.
Install the left handlebar switch onto the handlebar, aligning the locating pin with the hole in the handlebar.



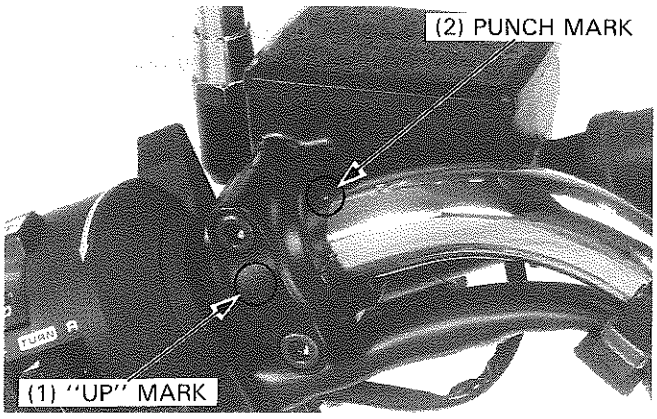
Install the left handlebar switch attaching screws, and tighten the forward screw first, then tighten the rear screw.



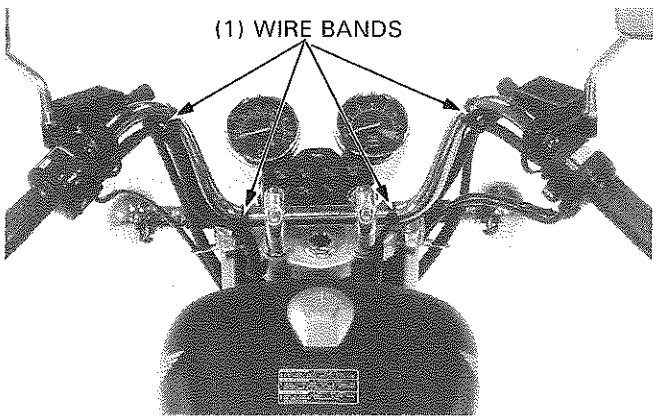
Install the clutch master cylinder and holder with the "UP" mark facing up.
Align the end of the holder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

Connect the clutch to switch wires.



Install the handlebar switch wire bands.



FRONT WHEEL

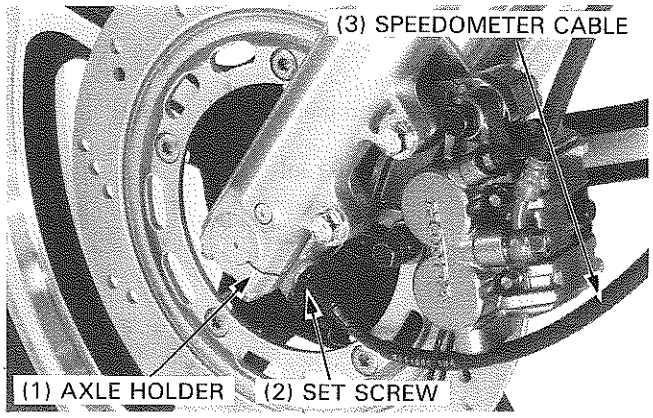
REMOVAL

Place the motorcycle on its center stand.

Remove the speedometer set screw and the speedometer cable.

Remove the right and left axle holders.

Jack up the engine until the forks clear the front axle and remove the front wheel.

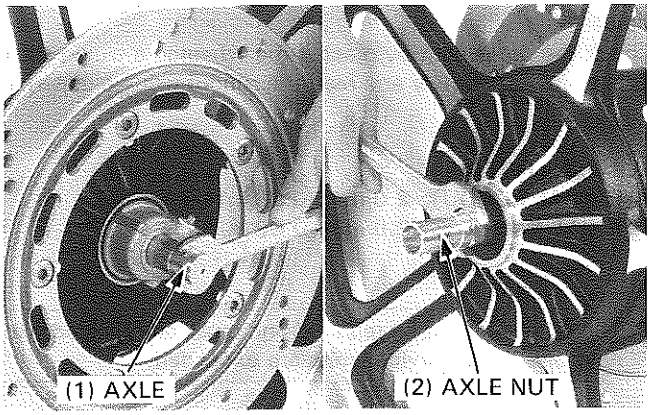


NOTE

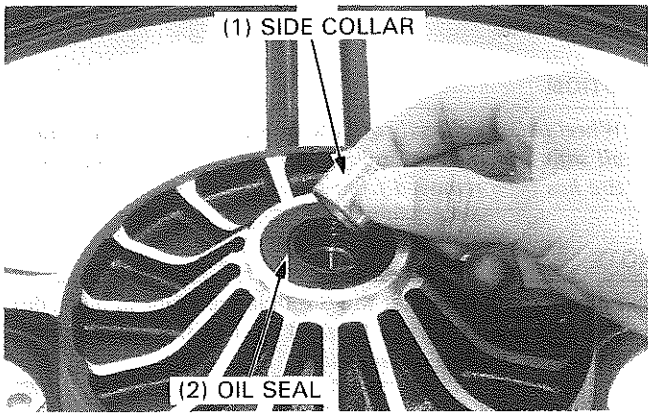
- Do not operate the front brake lever after removing the front wheel. To do so will cause difficulty in fitting the brake disc between the brake pads.

DISASSEMBLY

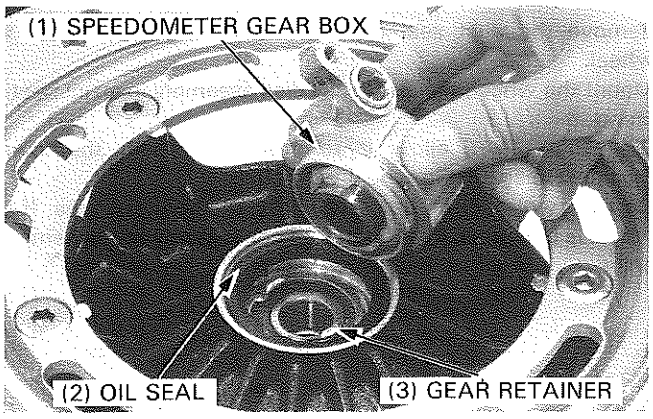
Remove the axle nut and axle.



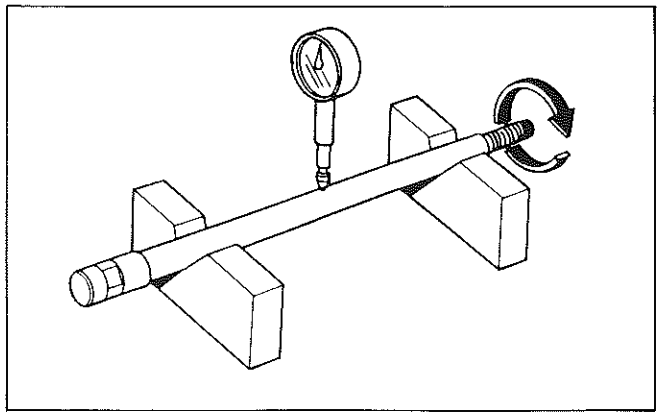
Remove the side collar and oil seal.



Remove the speedometer gear box, oil seal and gear retainer.

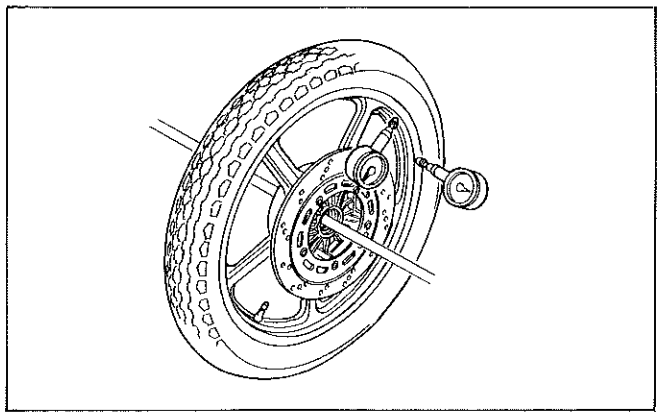


INSPECTION



Axle
Set the axle in V blocks and measure the runout.

SERVICE LIMIT: 0.2 mm (0.01 in)



Wheel
Check the rim runout by placing the wheel in a truing stand. Spin the wheel slowly and read the runout using a dial indicator.

SERVICE LIMITS:
RADIAL RUNOUT: 2.0 mm (0.08 in)
AXIAL RUNOUT: 2.0 mm (0.08 in)

NOTE

- The wheel cannot be repaired and must be replaced with a new one if the service limits are exceeded.

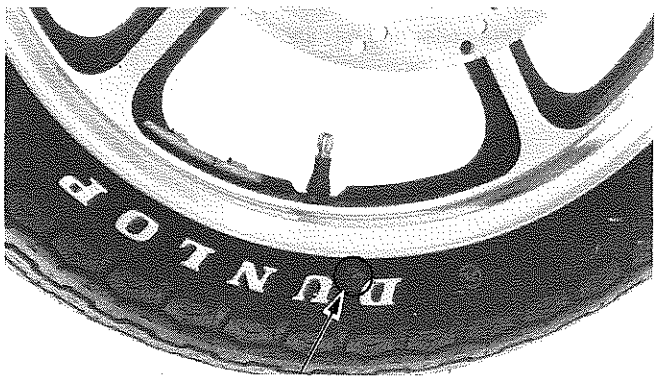
Wheel Balance

CAUTION

- *Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance when the tire has been removed from the rim.*

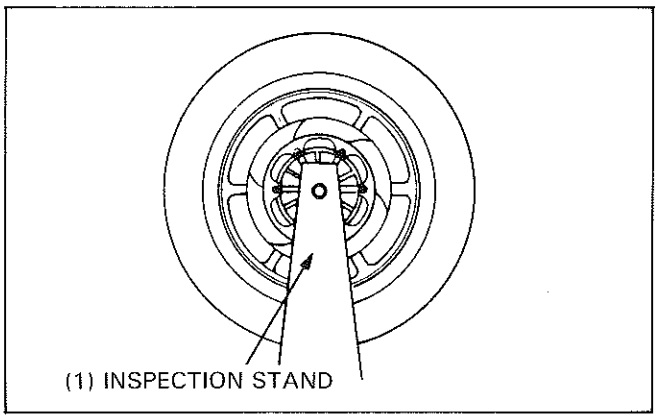
NOTE

- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.



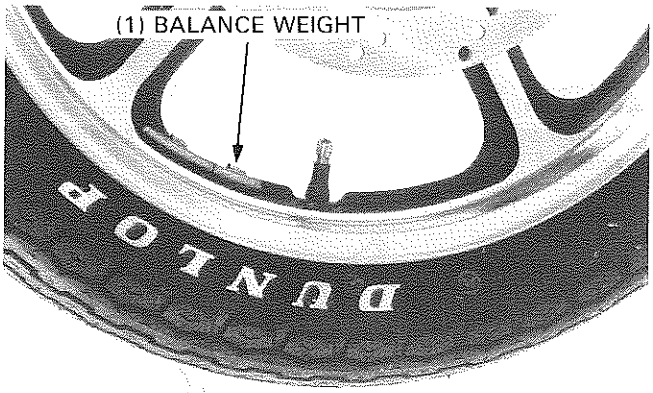
(1) TIRE BALANCE MARK

Remove the dust seal and speedometer gearbox from the wheel.
Mount the wheel, tire and brake disc assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.
Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.



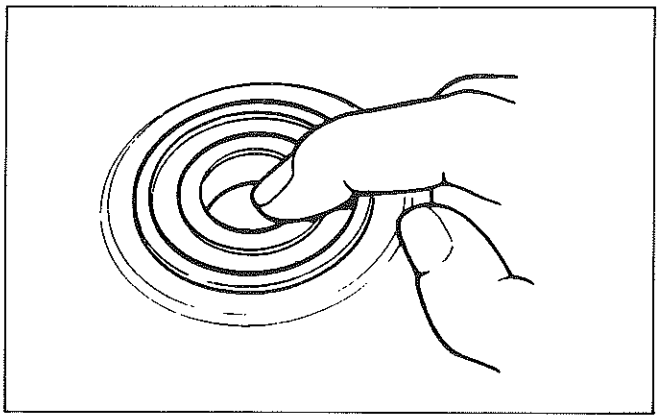
(1) INSPECTION STAND

To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it's spun.
Do not add more than 60 grams to the front wheel.



Wheel bearing
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

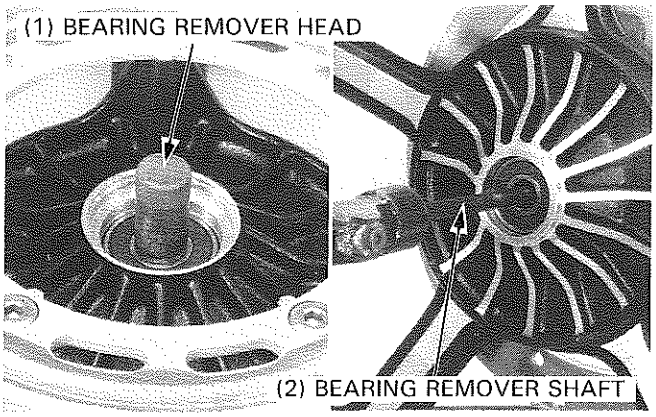


NOTE

- Replace hub bearings in pairs.

BEARING REPLACEMENT

Install the bearing remover head into the bearing.
From the opposite side install the bearing remover shaft and drive the bearing out of the wheel.
Remove the distance collar and drive out other bearing.



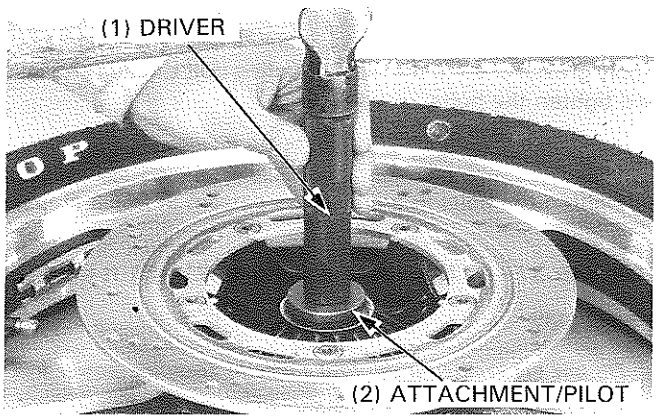
NOTE

- If the bearings are removed, they must be replaced with new ones.

TOOLS:

Bearing remover shaft	**07746—0050100**
Bearing remover head, 15 mm	**07746—0050400**
	or equivalent commercially avaitable in U.S.A.

Drive a new left bearing into the wheel securely, until its seated.
Install the distance collar and drive a new right bearing in securely, until its seated.



NOTE

- Do not allow the bearings to tilt while driving them in.
- Never install an old bearing, once a bearing is removed, it must be replaced with a new one.

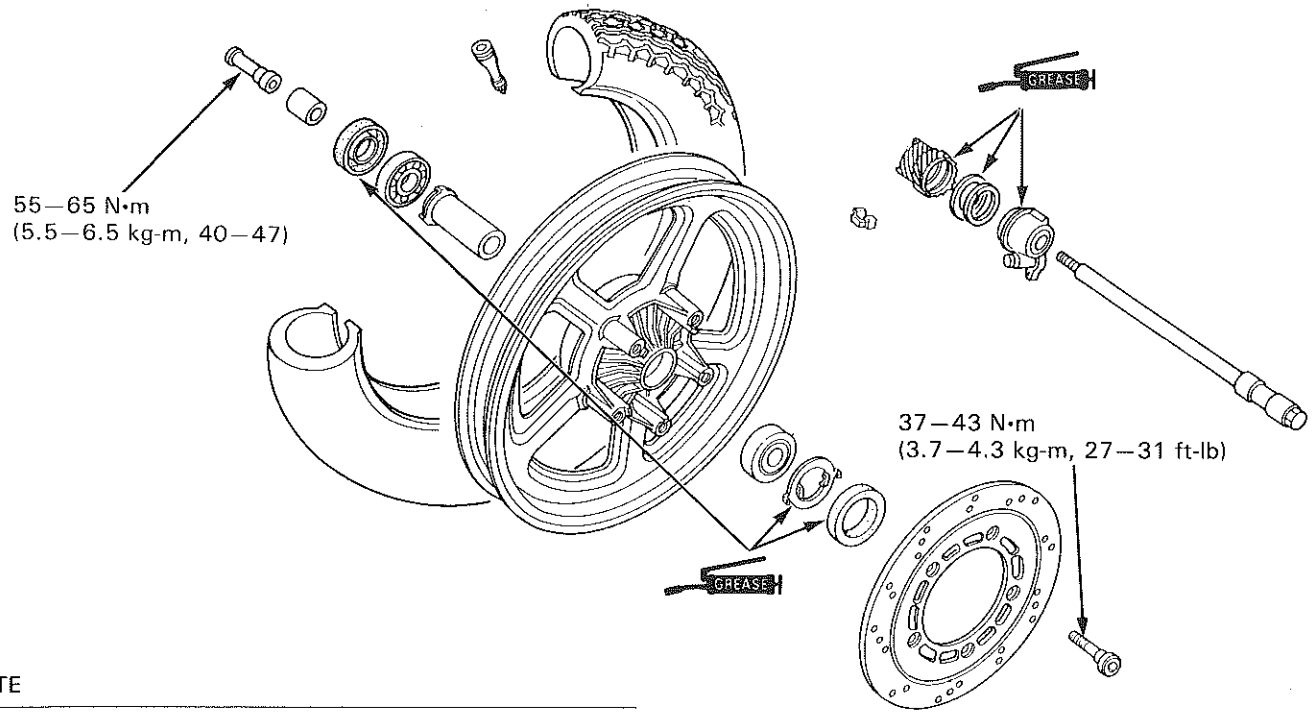
TOOLS:

Driver	**07749—0010000**
Attachment, 42 x 47 mm	**07746—0010300**
Pilot, 15 mm	**07746—0040300**

ASSEMBLY

WARNING

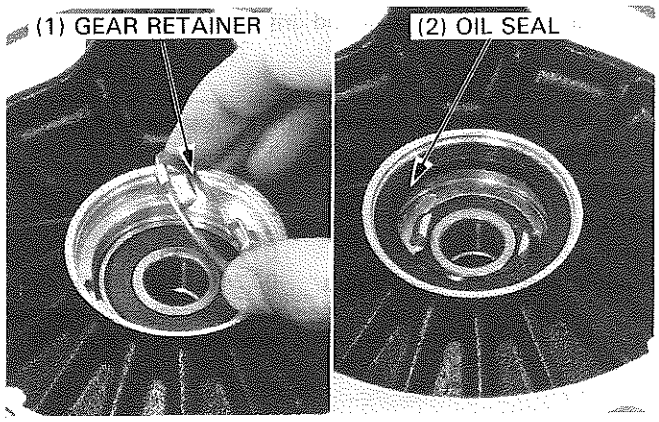
- ***Do not get grease on the brake disc or stopping power will be reduced.***



NOTE

- The cast wheel has no rim band.
- The front wheel uses a tubeless tire. For tubeless tire repair, refer to the Honda Tubeless Tire Manual.

Coat the speedometer gear retainer with grease and install the retainer into the wheel hub, aligning the tangs with the slots in the hub.
Apply grease to the oil seal lip and install the oil seal over the gear retainer.



If the brake disc was removed, install it onto the wheel hub. Apply grease or oil to the disc mounting bolt threads and install and tighten the bolts.

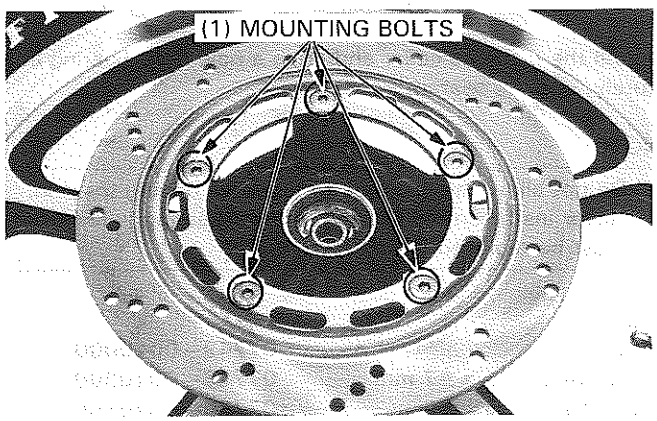
NOTE

- Tighten the bolts in a crisscross pattern in 2— 3 steps.

TORQUE: 37—43 N·m (3.7—4.3. kg-m, 27—31 ft-lb)

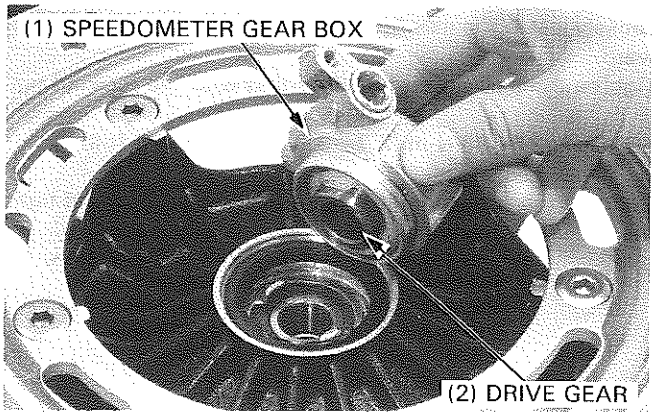
WARNING

- ***Do not get grease on the brake disc or stopping power will be reduced.***

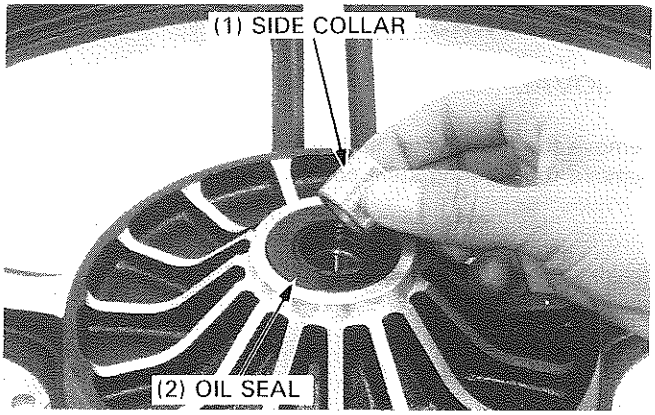


Fill the speedometer gear box with grease and install the plain washer and drive gear.

Install the speedometer gear box into the wheel hub and insert the axle.

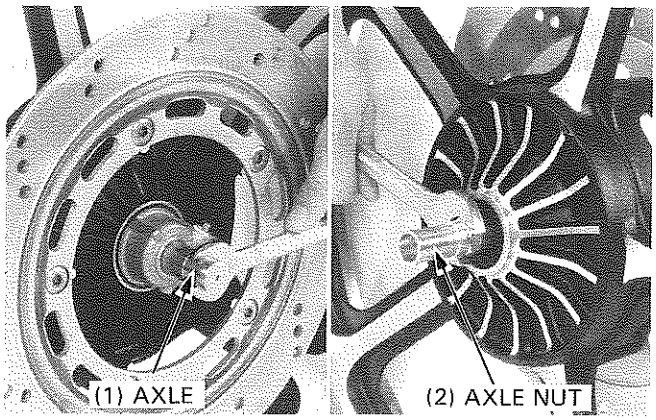


Apply grease to the oil seal lip and install the seal into the wheel.
Install the side collar.



Insert the axle from the left side, then install and tighten the axle nut.

TORQUE: 55—65 N·m (5.5—6.5 kg-m, 40—47 ft-lb)



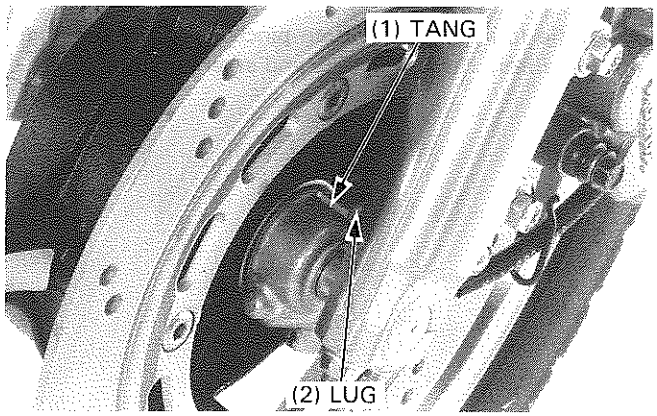
INSTALLATION

Position the wheel between the fork legs.
Lower the frame so that the fork legs rest on the top of the axle and the brake disc is positioned between the pads.

CAUTION

- *Use care not to damage the pads when installing the wheel.*

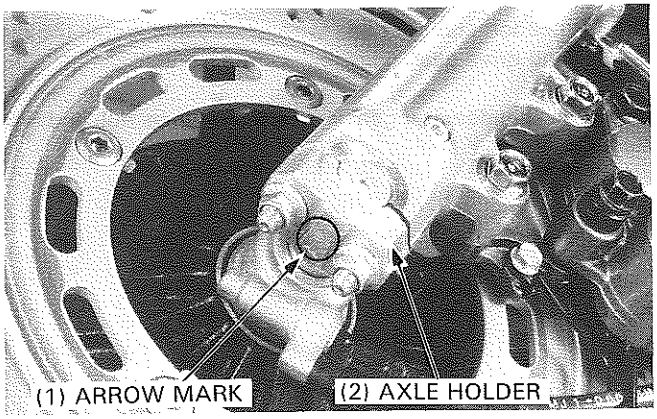
Position the tang on the speedometer gear box against the back of the leg on the left fork.



Loosely install the axle holders with the arrow mark facing forward.
Tighten the axle holder nuts, starting with the forward nut.

TORQUE: 27—33 N•m (2.7—3.3 kg-m, 20—24 ft-lb)

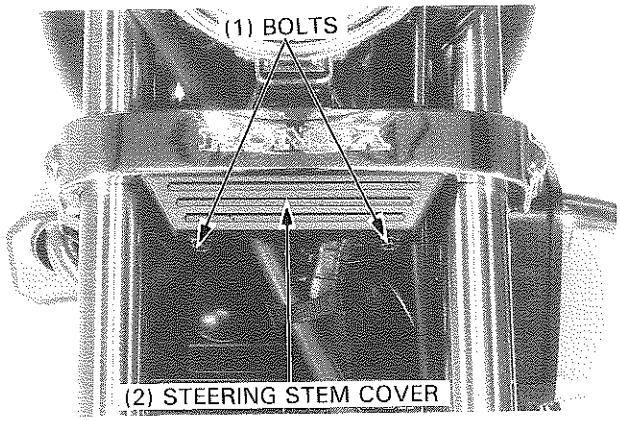
Connect the sepeedometer cable to the gear box and tighten the set screw securely.



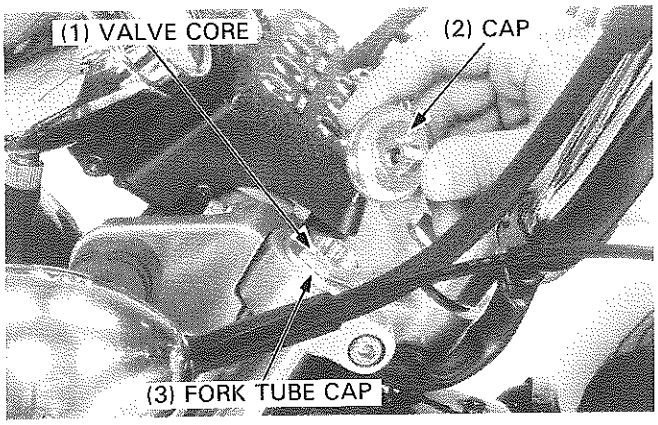
FRONT FORKS

REMOVAL

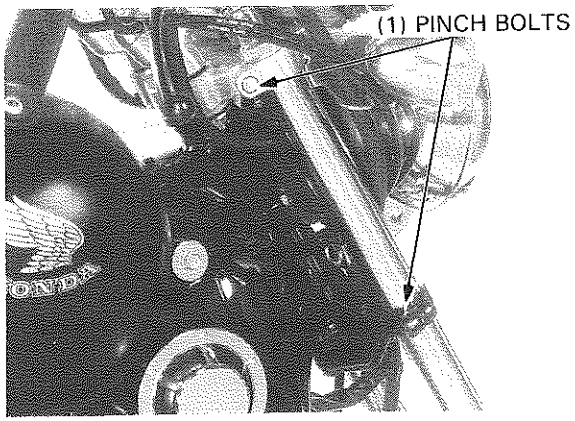
Remove the front wheel and fender.
Remove the steering stem cover by removing the two bolts.



Remove the air valve caps.
Depress the valve core to release the air from each fork tube.
Loosen the fork tube cap.



Loosen the fork top and bottom pinch bolts and remove the front forks from the fork bridge and steering stem.



DISASSEMBLY

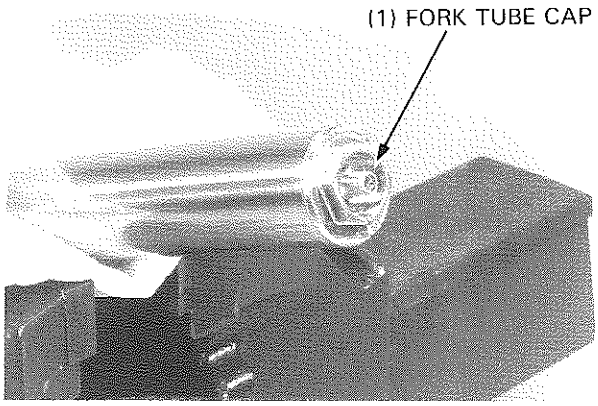
Hold the fork tube in a vise, with soft jaws or use a shop towel, and remove the fork tube cap.

CAUTION

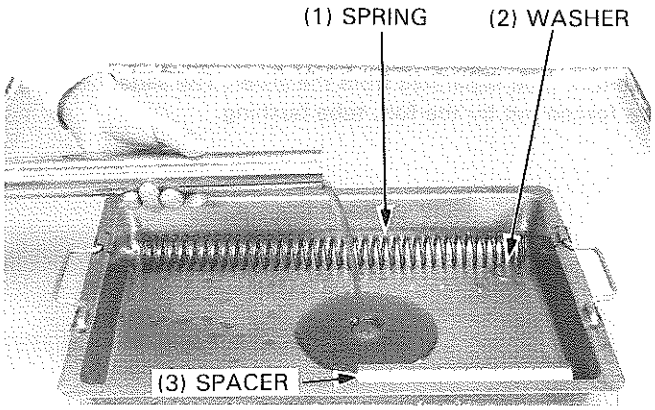
- *Be careful not to damage the fork tube's sliding surface.*

WARNING

- ***The cap is under spring pressure. Use care when removing it and wear eye and face protection.***



Remove the spacer, washer and fork spring.
Pour out the fork fluid by pumping the fork up and down several times.

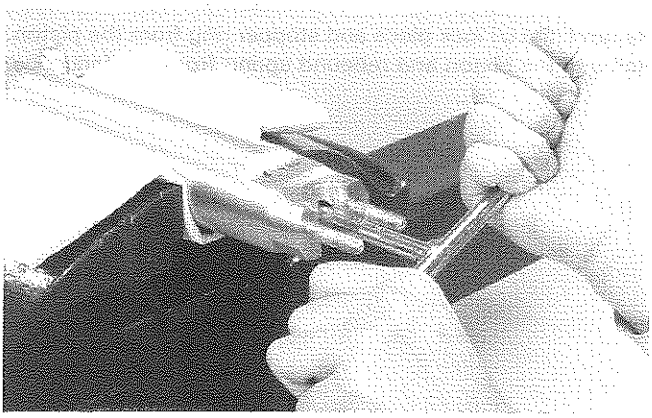


Hold the fork slider in a vise with soft jaws or use a shop towel.

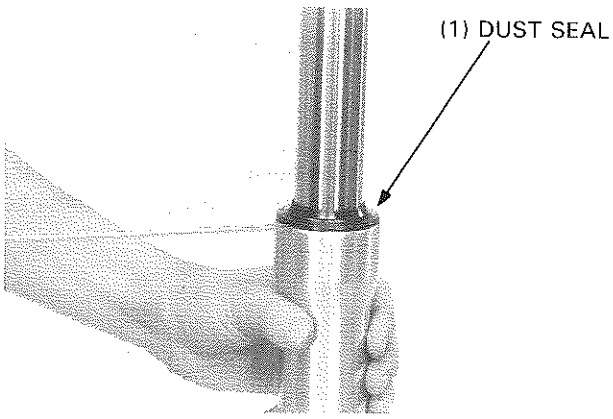
Remove the socket bolt with a hex wrench.

NOTE

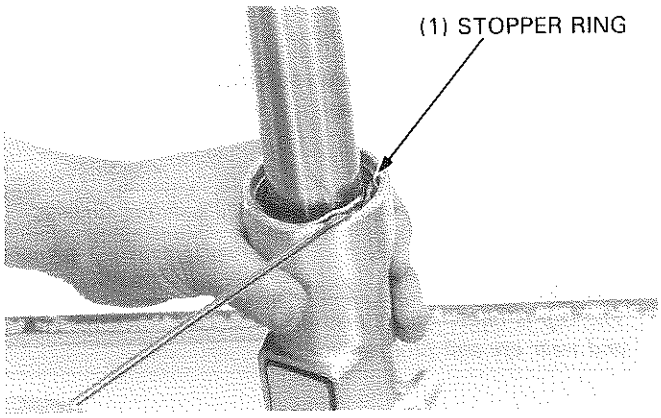
- Temporarily install the spring and fork bolt if difficulty is encountered in removing the bolt.



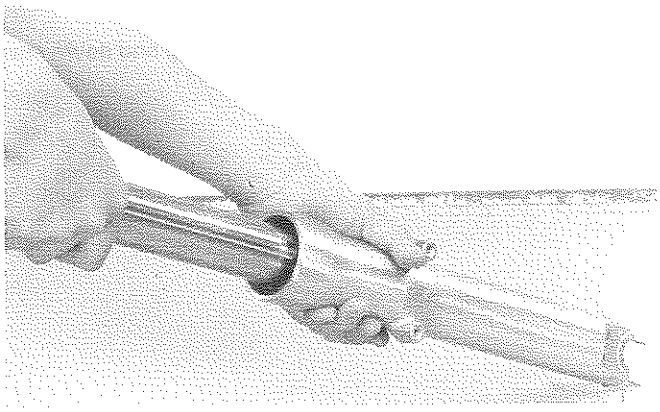
Remove the dust seal.



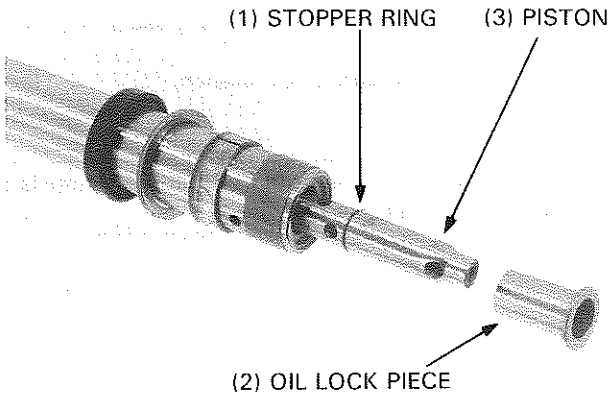
Remove the stopper ring.



Pull the fork tube out until resistance from the slider bushing is felt. Then move it in and out, tapping the bushing lightly until the fork tube separates from the slider. The slider bushing will be forced out by the fork tube bushing.



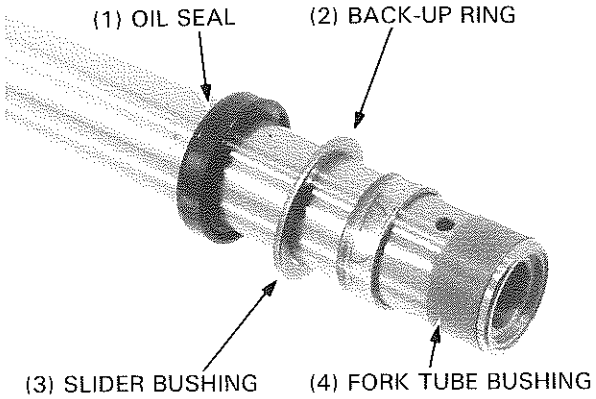
Remove the oil lock piece and stopper ring from the piston. Remove the piston and rebound spring from the fork tube.



Remove the oil seal, back-up ring and slider bushing from the fork tube.

NOTE

- Do not remove the fork tube bushing unless it is necessary to replace it with a new one. See bushing inspection, page 15-15.



INSPECTION

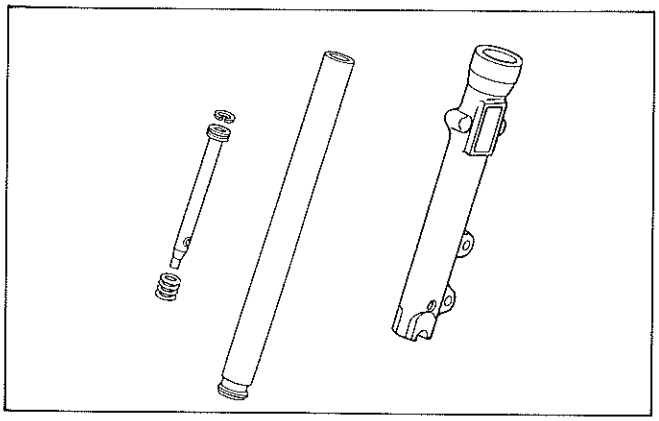
Fork spring
Measure the fork spring free length.

SERVICE LIMIT: 417.7 mm (16.44 in)

Replace the spring if it is shorter than the service limit.

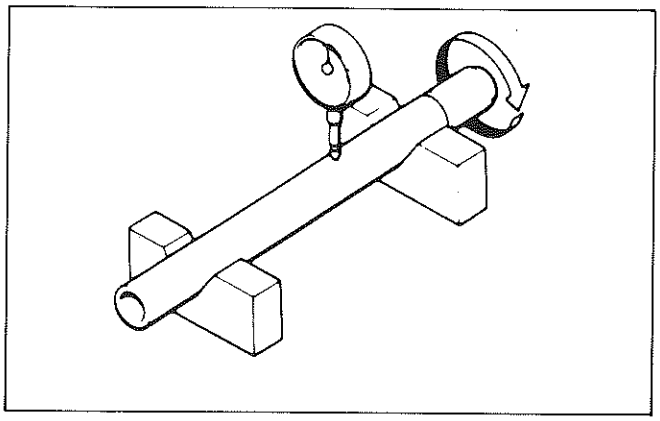
Fork tube/slider/piston
Check the fork tube, fork slider and piston for score marks, excessive or abnormal wear.
Replace any components which are worn or damaged.

Check the fork piston ring for wear or damage.
Check the rebound spring for fatigue or damage.



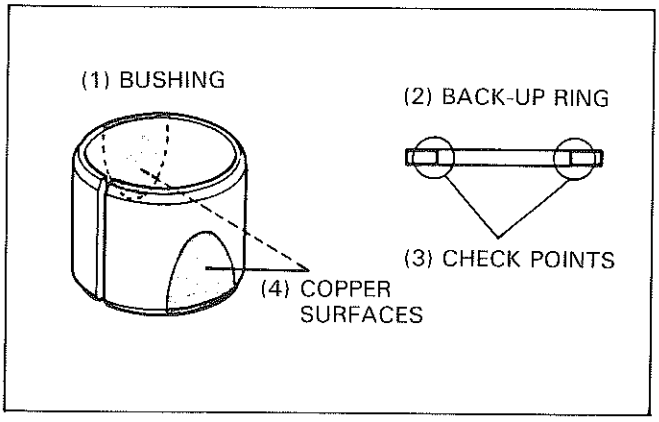
Set the fork tube in V blocks and read the runout.
Use 1/2 the total indicator reading to determine the actual runout.

SERVICE LIMIT: 0.20 mm (0.008 in)



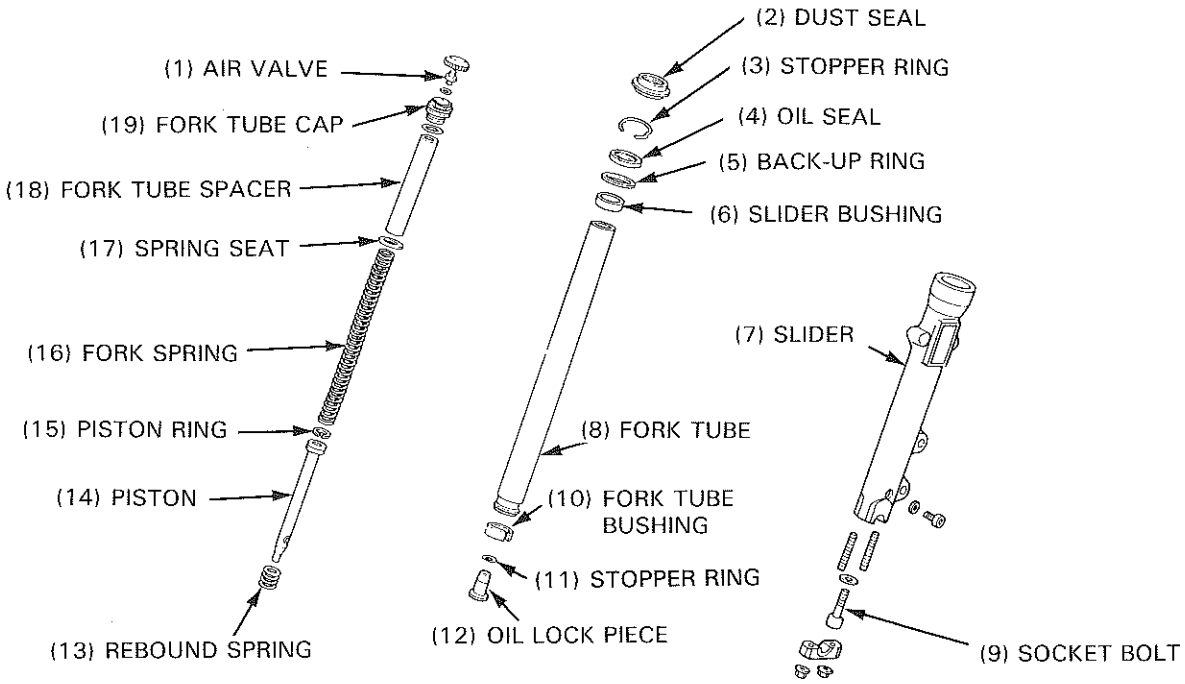
Fork tube bushing
Visually inspect the slider and fork tube bushings.
Replace the bushings if there is excessive scoring or scratching, or if the teflon is worn so that the copper surface appears on more than 3/4 of the entire surface.

Check the back-up ring; replace it if there is any distortion at the points shown.

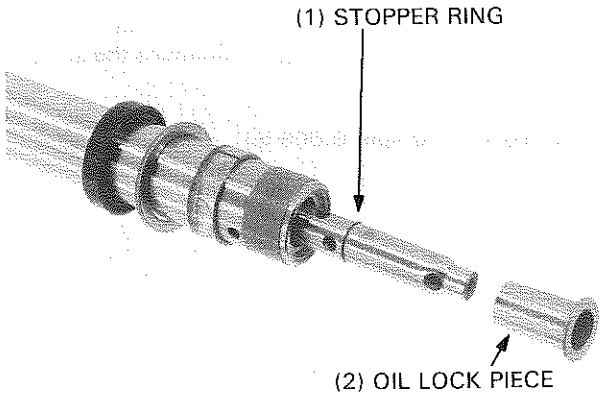


ASSEMBLY

Before assembly, wash all parts with a high flash point or non-flammable solvent and wipe them off completely.



Install the rebound spring into the fork tube.
Install a new stopper ring onto the piston groove.
Place the oil lock piece on the end of the piston and insert the fork tube into the slider.

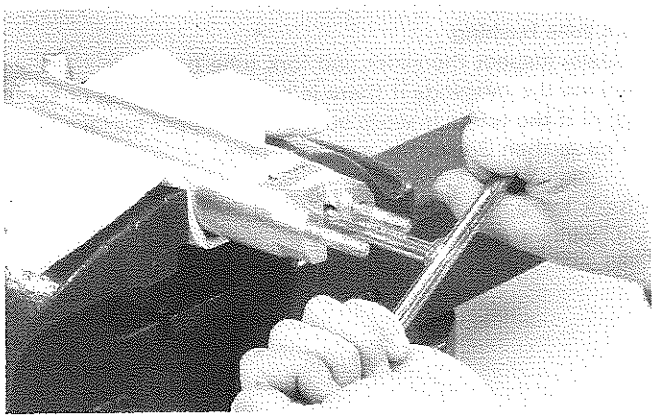


Place the fork slider in a vise with soft jaws or use a shop towel. Apply a locking agent to the socket bolt and thread it into the piston. Tighten with a 6 mm hex wrench.

NOTE

- Temporarily install the fork spring and fork cap bolt to tighten the socket bolt.

TORQUE: 15—25 N·m (1.5—2.5 kg-m, 11—18 ft-lb)

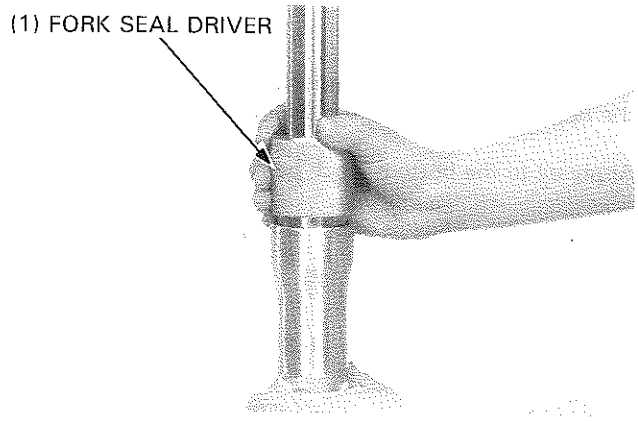


Place the slider bushing over the fork tube and rest it on the slider.

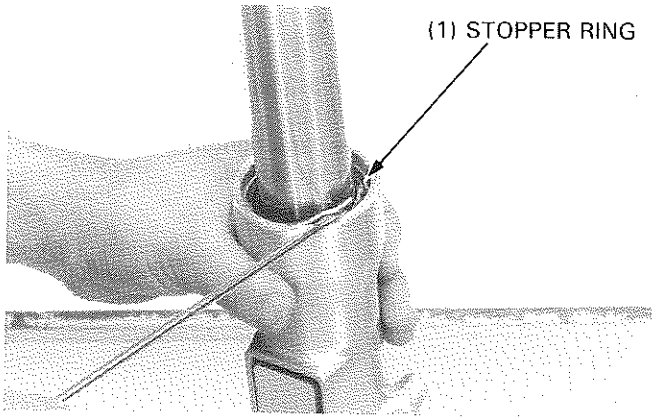
Drive the bushing into place with the seal driver and remove the old bushing or equivalent tool.

Coat a new oil seal with ATF and install it with the seal markings facing up. Drive the seal in with the seal driver.

TOOLS:
Fork seal driver **07947—4630100**

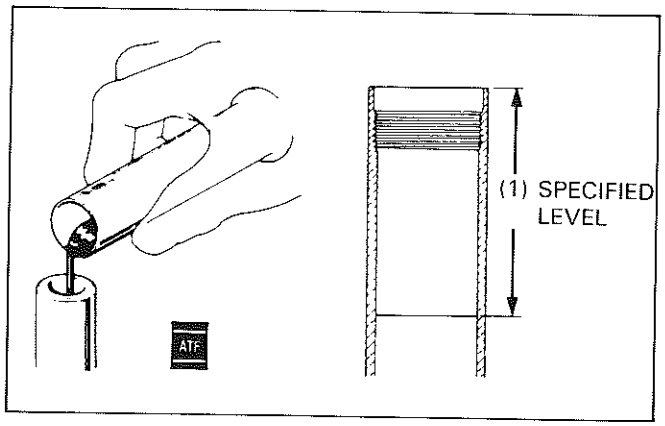


Install the stopper ring into the groove in the fork slider.



Compress the front fork and pour ATF into the fork tube.

SPECIFIED LEVEL: 134 mm (5.3 in)
CAPACITY: 442.5—447.5 cc (14.99—15.16 US oz, 15.59—15.77 Imp oz)



Install the fork spring, washer and spacer into the fork tube.

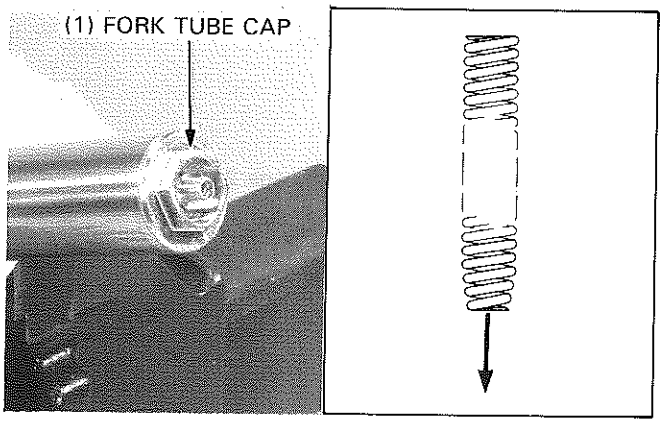
NOTE

- Note the spring direction; the tapered end must face toward the bottom.

Loosely install the fork tube cap with a new O-ring.

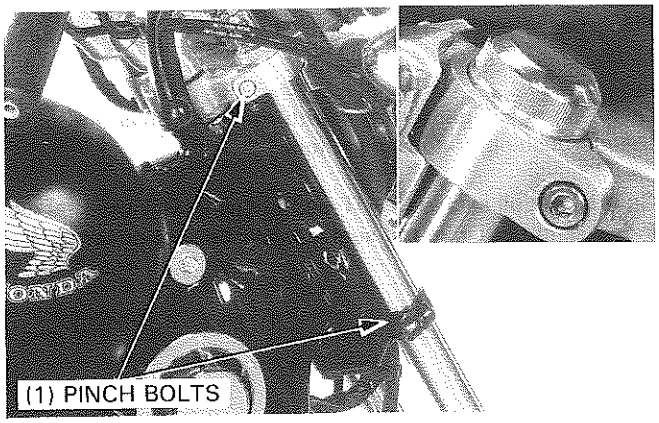
CAUTION

- *Do not damage the fork tube sliding surface.*



INSTALLATION

Install the front fork and align the top end of the fork tube with the upper surface of the top bridge as shown.



Apply oil to the bottom pinch bolt and tighten it.

TORQUE: 45—55 N·m (4.5—5.5 kg-m, 33—40 ft-lb)

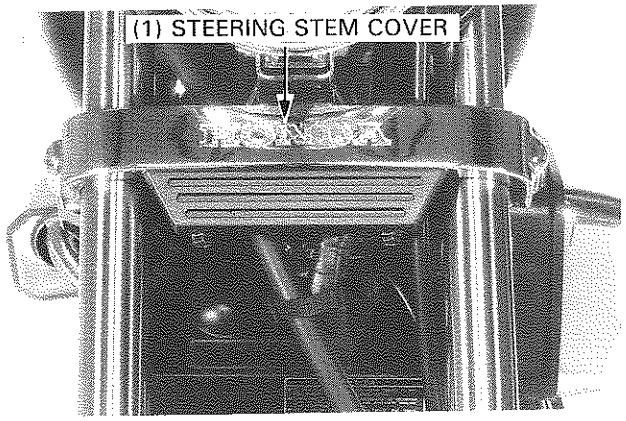
Tighten the top pinch bolt.

TORQUE: 9—13 N·m (0.9—1.3 kg-m, 7—9 ft-lb)

Tighten the fork tube cap.

TORQUE: 15—30 N·m, (1.5—3.0 kg-m, 11—22 ft-lb)

Install the steering stem cover and tighten the two bolts.
Install the front fender and front wheel.

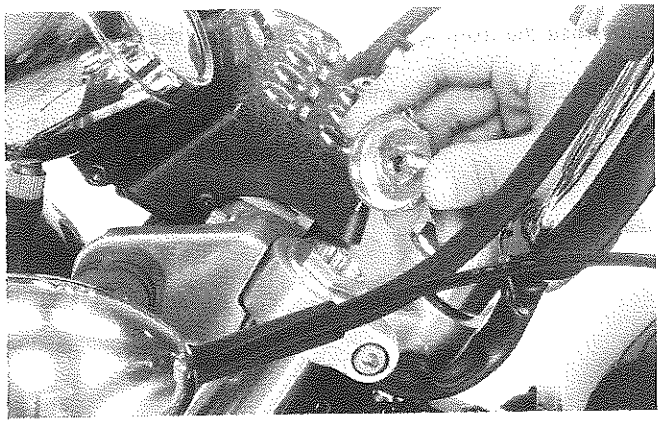


Fill the fork tubes with air to 0—40 kPa (0—0.4 kg/cm^2, 0—6 psi).

CAUTION

- *Use only a hand operated air pump to fill the fork tubes. Do not use compressed air.*
- *Maximum pressure is 300 kPa (3 kg/cm^2, 43 psi). Do not exceed this or fork tube component damage may occur.*

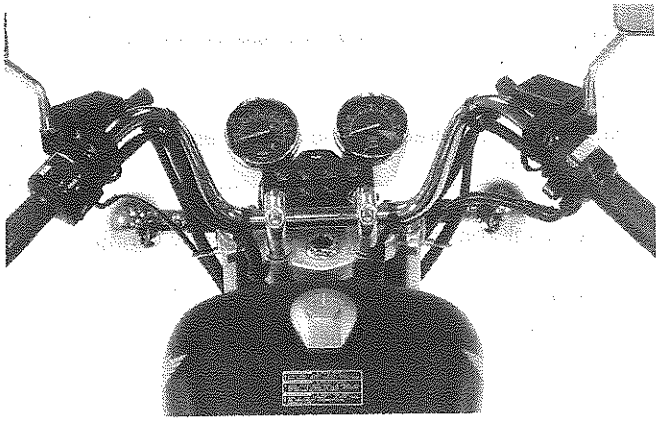
With the front brake applied, pump the front forks up and down several times. Place the motorcyle on its center stand. Check the air pressure and adjust if necessary.



STEERING STEM

REMOVAL

Remove the following:
- headlight and headlight case (page 21-8)
- instruments (page 21-6)
- handlebar (page 15-3)
- front wheel (page 15-7)

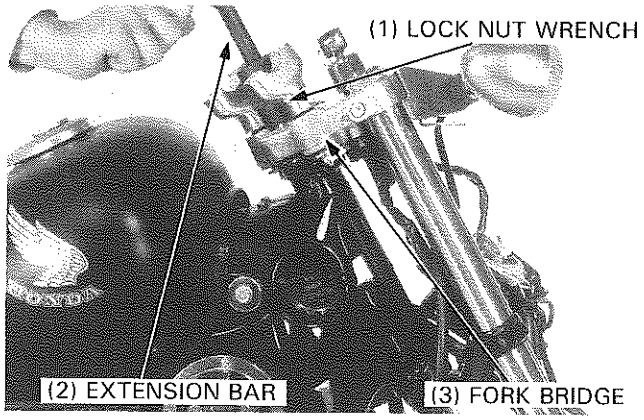


Remove the steering stem nut.

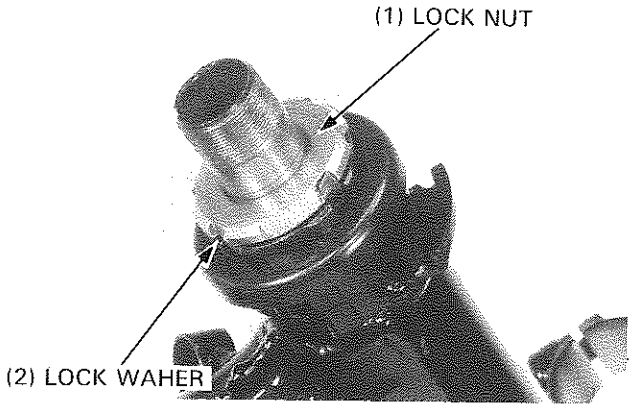
TOOLS:

Lock nut wrench, 30 x 32 mm	**07716—0020400 or equivalents commercially available in U.S.A.**
Extension	**07716—0020500 or equivalents commercially available in U.S.A.**

Remove the front forks and fork bridge.



Straighten the lock washer tabs and remove the lock nut and lock washer.

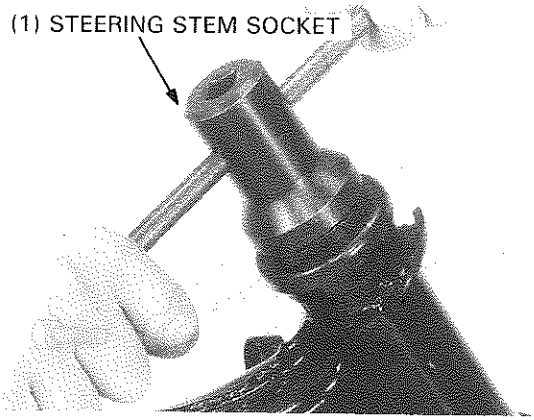


Remove the bearing adjustment nut.

TOOL:

Steering stem socket	**07916—3710100**

Remove the dust seal, upper bearing inner race and bearing, then remove the steering stem.



Remove the grease retainer from the stem.

Check the bearings, inner and outer races for wear or damage and replace if necessary.

BEARING RACE REPLACEMENT

NOTE

- Always replace the bearing and races as a set.

Remove the upper bearing outer race with the Aside of the ball race remover.

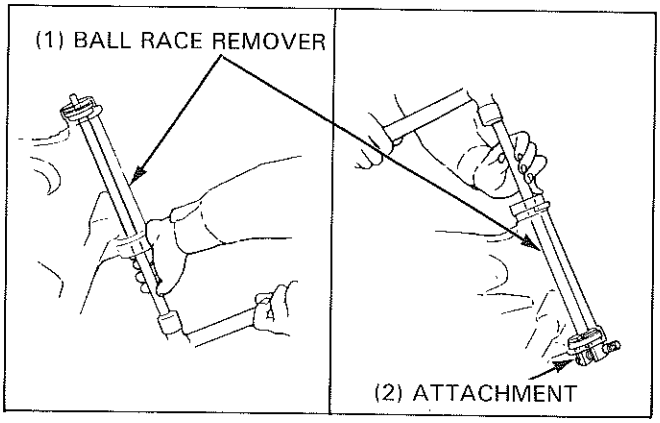
TOOL:

Ball race remover	**07953—MJ10000 or 07953—MJ00000A (U.S.A. only)**

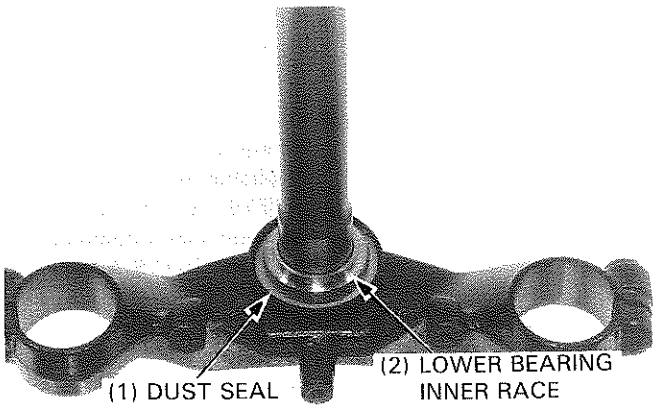
Remove the lower bearing outer race with the ball race remover and attachment.

TOOLS:

Ball race remover	**07953—4250002**
Ball race remover attachement	**07946—3710500**

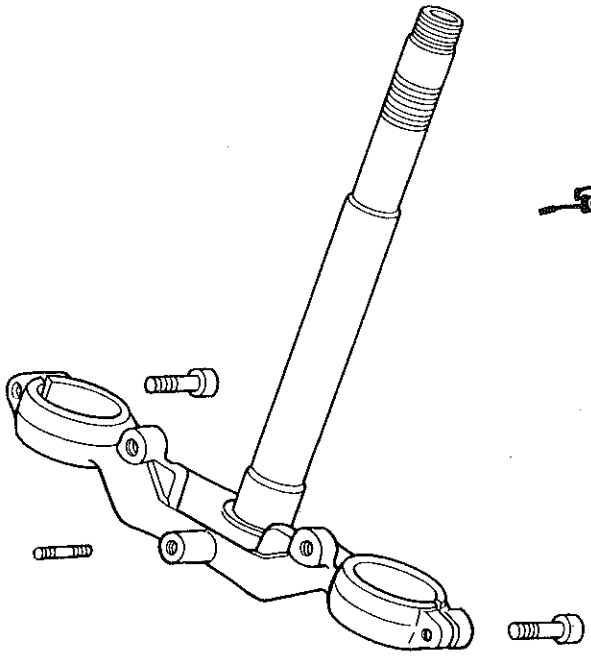


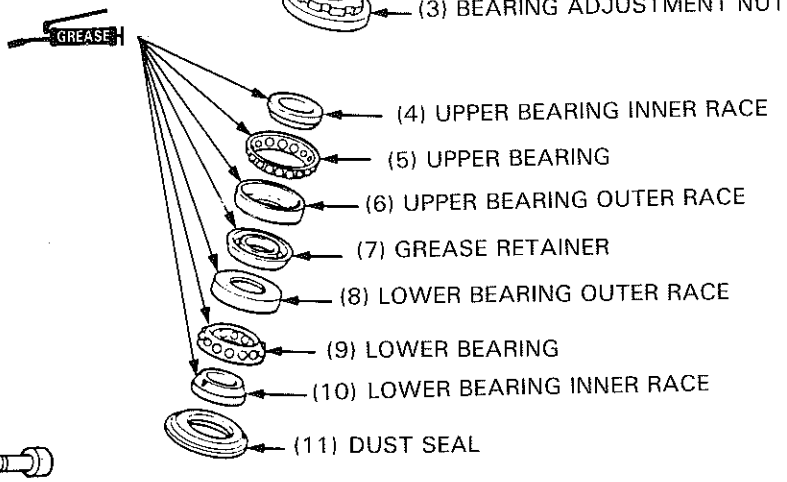
Install the stem nut onto the stem to prevent the threads from being damaged when removing the lower bearing inner race from the stem.
Remove the lower bearing inner race with a chisel or equivalent tool, being careful not to damage the stem.
Remove the dust seal



NOTE

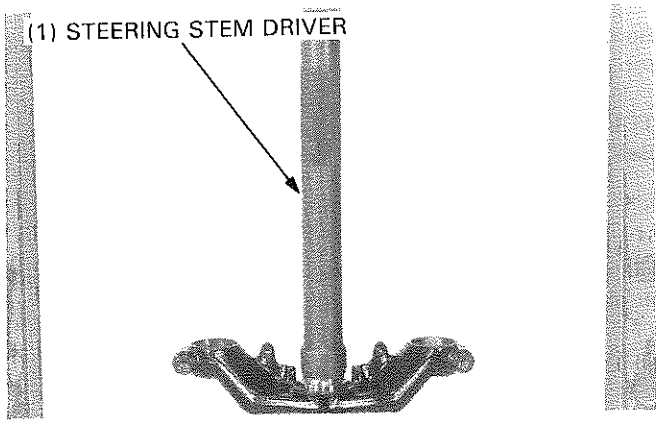
- If the motorcycle has been involved in an accident, examine the area around the steering head for cracks.





Install a new dust seal over the steering stem.
Press a new lower bearing inner race onto the stem.

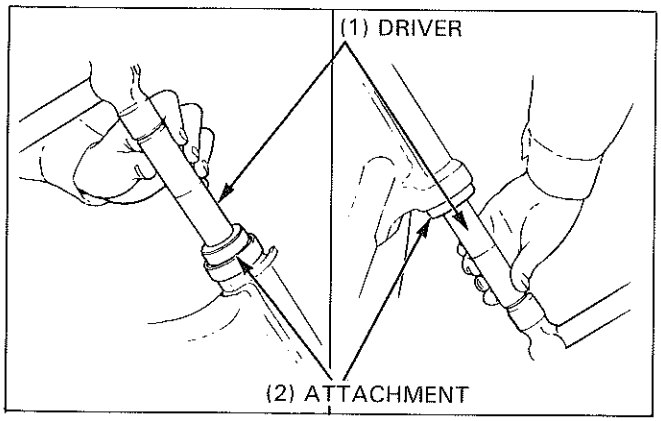
TOOL:
Steering stem driver **07946—MB00000**



Drive new upper and lower bearing outer races into the steering head pipe.

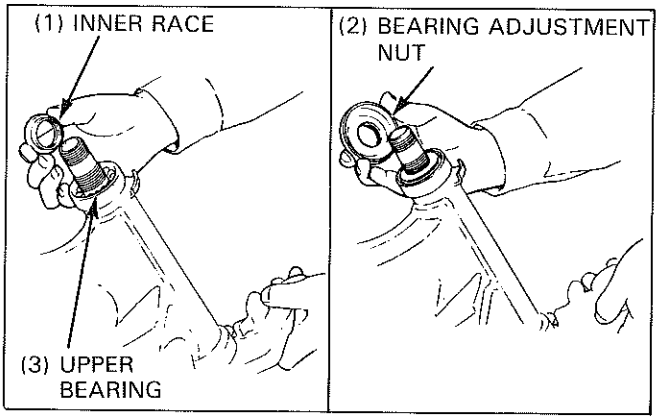
TOOLS:

Upper bearing outer race:	
Driver	**07749—0010000**
Attachment, 42 x 47 mm	**07746—0010300**
Lower bearing outer race:	
Driver	**07749—0010000**
Attachment, 52 x 55 mm	**07746—0010400**



INSTALLATION

Pack the bearing cavities with grease.
Install the lower bearing and grease retainer onto the stem.
Insert the stem into the steering head pipe and install the upper bearing, inner race, and steering bearing adjustment nut.

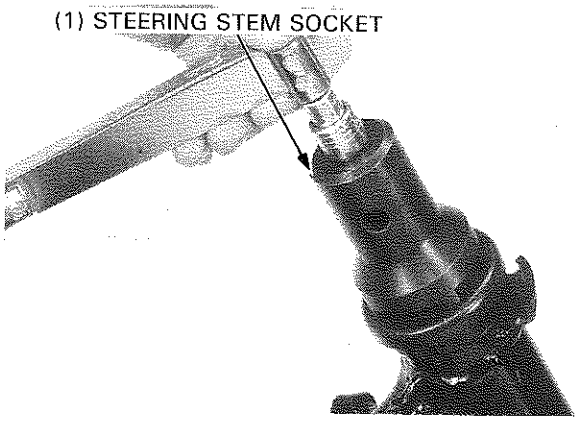


Tighten the steering bearing adjustment nut to the specified torque.

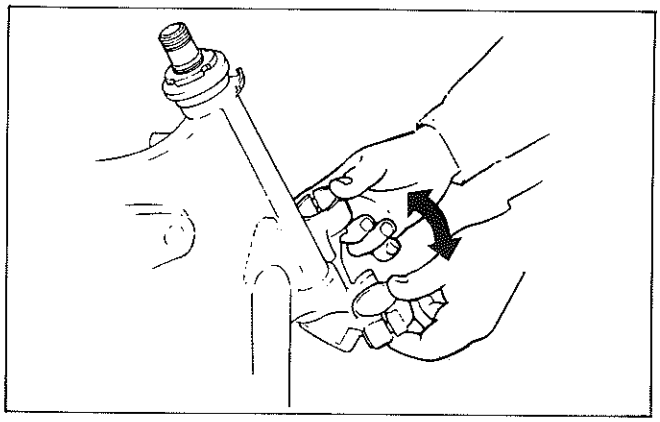
TORQUE: 23—27 N·m (2.3—2.7 kg-m, 17—20 ft-lb)

TOOL:

Steering stem socket	**07916—3710100**

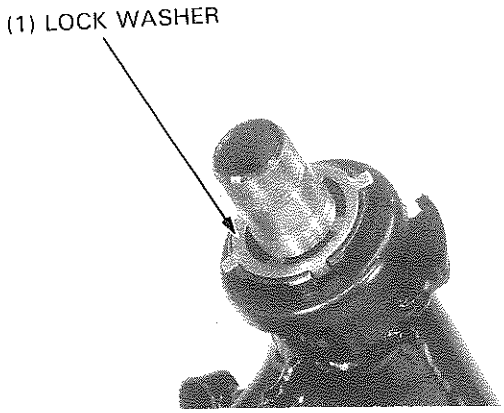


Turn the steering stem back and forth four or five times to seat the bearings.
Retighten the adjustment nut to the same torque.
Turn the steering stem to seat the bearings.



Install a new lock washer and bend the two opposite tabs down into the grooves in the adjustment nut.

Install and finger tighten the lock nut all the way.
Hold the bearing adjustment nut and further tighten the lock nut, within 90 degrees, to align its grooves with the tabs of the lock washer.
Bend up the lock washer tabs into the grooves of the lock nut.

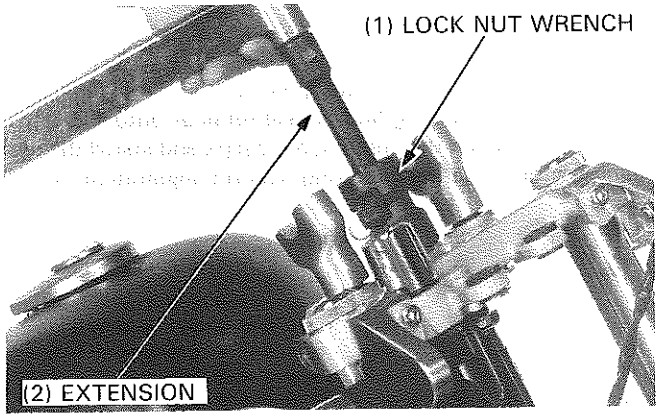


Install the fork bridge and stem nut.
Temporarily install the front forks.
Tighten the stem nut.

TORQUE: 90—120 N·m (9.0—12.0 kg-m, 65—87 ft-lb)

TOOLS:

Lock nut wrench, 30 x 32 mm	**07716—0020400 or equivalent commercially available in U.S.A.**
Extension	**07716—0020500 or equivalent commercially available in U.S.A.**

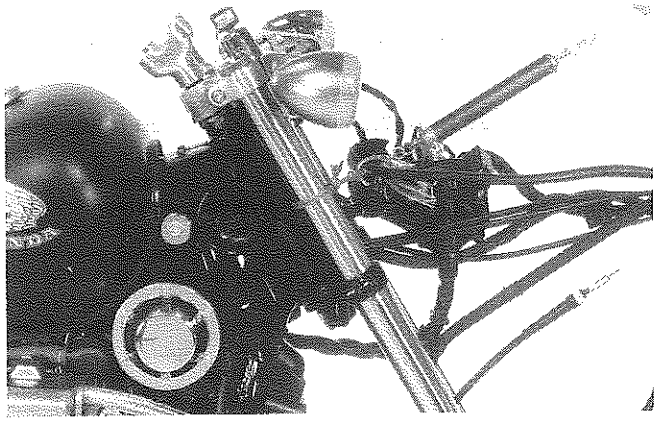


STEERING HEAD BEARING PRELOAD

Install the front forks (page 15-18).
Install the front wheel (page 15-11).
Place a stand under the engine and raise the front wheel off the ground.
Position the steering stem to the straight ahead position.
Hook a spring balancer to the fork tube and measure the steering head bearing preload.

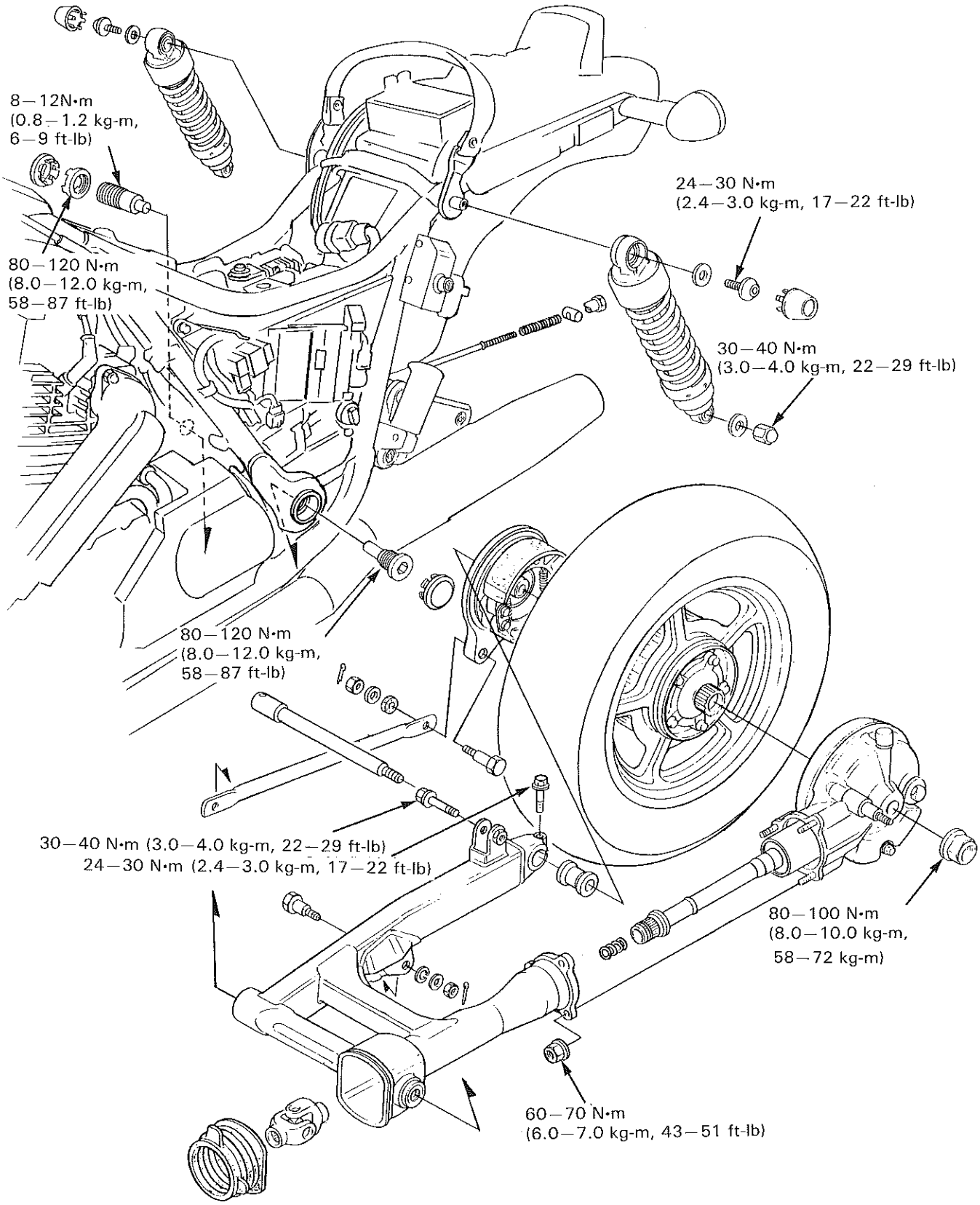
NOTE

- Make sure that there is no cable or wire harness interference.



The preload should be within 1.1—1.6 kg (2.4—3.5 lb) for right and left turns.
If the readings do not fall within the limits, lower the front wheel on the ground and adjust the steering bearing adjustment nut.

After making sure the bearing preload, install the removed parts in the reverse order of removal.


8—12N·m
(0.8—1.2 kg-m,
6—9 ft-lb)
80—120 N·m
(8.0—12.0 kg-m,
58—87 ft-lb)
24—30 N·m
(2.4—3.0 kg-m, 17—22 ft-lb)
30—40 N·m
(3.0—4.0 kg-m, 22—29 ft-lb)
80—120 N·m
(8.0—12.0 kg-m,
58—87 ft-lb)
30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)
24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)
80—100 N·m
(8.0—10.0 kg-m,
58—72 kg-m)
60—70 N·m
(6.0—7.0 kg-m, 43—51 ft-lb)

16. REAR WHEEL/SUSPENSION/BRAKE

SERVICE INFORMATION

GENERAL

- The rear wheel uses a tubeless tire. For tubeless tire repairs, refer to the Tubeless Tire Manual.
- Never ride on the rim.
- When using the lock nut wrench, use a 20 inche long deflecting beam type torque wrench. The lock nut wrench increases the torque wrench's leverage, so the torque wrench reading will be less than the torque actually applied to the lock nut.

WARNING

- ***Brake dust may contain asbestos which can be harmful to your health. Do not use compressed air to clean brake drums or brake panels. Use a vacuum with a sealed dust collector. Wear a protective face mask and thoroughly wash hands when finished.***

SPECIFICATIONS

Unit: mm (in)

ITEM		STANDARD	SERVICE LIMIT
Axle runout		—	0.2 (0.01)
Rear wheel rim runout	Radial	—	2.0 (0.08)
	Axial	—	2.0 (0.08)
Shock absorber spring free length		240.1 (9.45)	235.3 (9.26)
Brake drum I.D.		180.0 (7.09)	181.0 (7.13)
Rear brake lining thickness		5.0 (0.20)	2.0 (0.08)

TORQUE VALUES

Rear axle nut	80—100 N·m (8.0—10.0 kg-m, 58—72 ft-lb)
Final gear case attaching nut	60—70 N·m (6.0—7.0 kg-m, 43—51 ft-lb)
Rear axle pinch bolt	24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)
Final driven flange bolt	50—60 N·m (5.0—6.0 kg-m, 36—43 ft-lb)
Rear brake arm	24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)
Shock absorber upper mount	24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)
Shock absorber lower mount bolt/nut	30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)
Swingarm left pivot bolt	80—120 N·m (8.0—12.0 kg-m, 58—87 ft-lb)
Swingarm right pivot bolt	8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)
Swingarm right pivot bolt lock nut	80—120 N·m (8.0—12.0 kg-m, 58—87 ft-lb)
Damper lock nut	25—40 N·m (2.5—4.0 kg-m, 18—19 ft-lb)

TOOLS

Special

Shock absorber attachment	07959—MB10000	
Lock nut wrench	07908—ME90000	
Socket bit, 10 mm	07703—0020200	or equivalent commercially available in U.S.A.
Socket bit, 14 mm	07703—0020400	

Common

Bearing remover shaft	07746—0050100	or equivalent commercially available in U.S.A.
Bearing remover head, 20 mm	07746—0050600	
Driver	07749—0010000	
Attachment, 42 x 47 mm	07746—0010300	
Pilot, 20 mm	07746—0040500	
Shock absorber compressor	07959—3290001	

TROUBLESHOOTING

Oscillation
- Bent rim
- Loose wheel bearings
- Faulty tire
- Loose axle
- Incorrect tire pressure
- Worn swingarm bearings
- Worn tires

Soft suspension
- Weak spring (s)

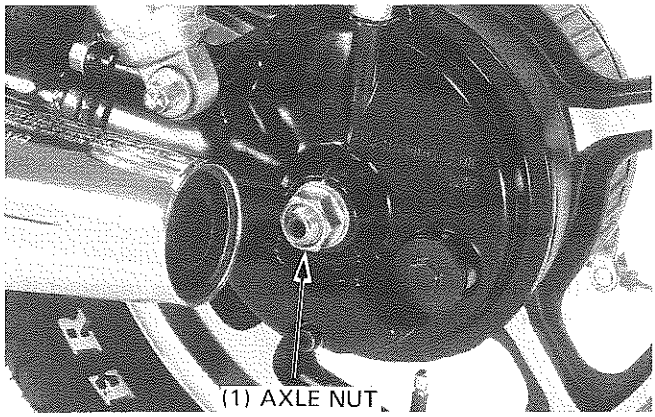
Hard suspension
- Bent shock absorber

Suspension noise
- Binding shock case
- Loose fasteners

REAR WHEEL

REMOVAL

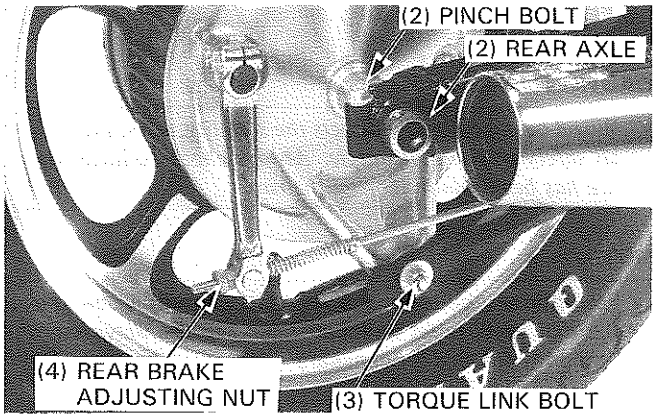
Place the motorcycle on its center stand and loosen the axle nut.



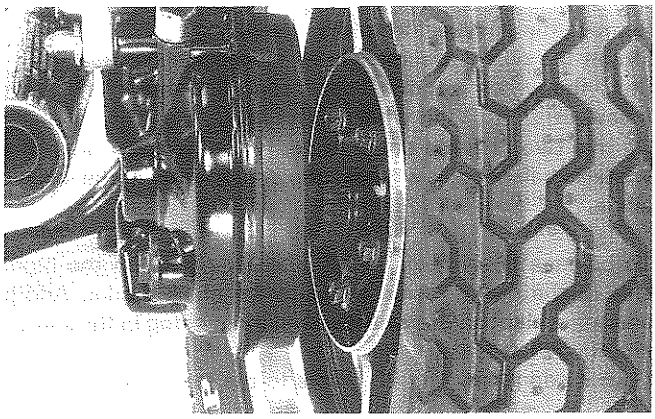
Remove the cotter pin, brake torque link nut, and disconnect the torque link.

Remove the brake adjusting nut and the brake rod.

Loosen the axle pinch bolt and remove the rear axle.



Move the wheel to the right to separate it from the final drive gear case and remove the rear wheel.

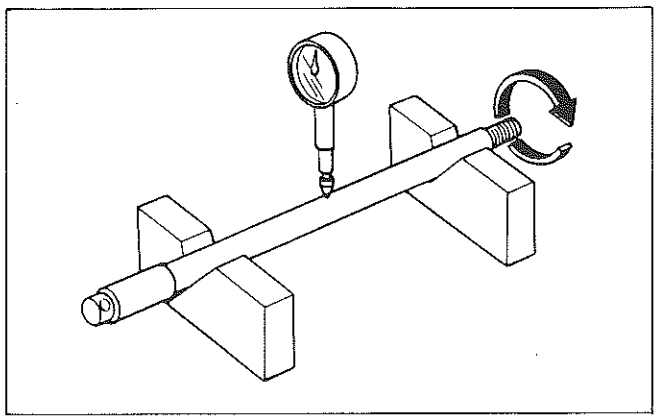


INSPECTION

Axle

Set the axle in V blocks and read the axle runout with a dial indicator. The actual axle runout is 1/2 of the total indicator reading.

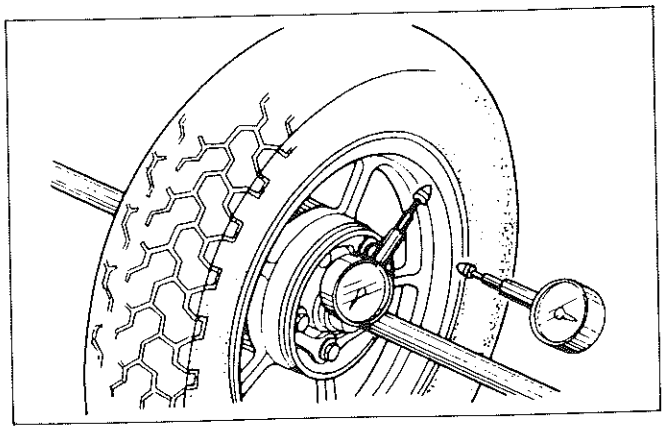
SERVICE LIMIT: 0.2 mm (0.01 in)



Wheel rim runout
Check the rim for runout by placing the wheel in a truing stand. Spin the wheel slowly, and read the runout using a dial indicator.

SERVICE LIMITS:
Radial runout:2.0 mm (0.08 in)
Axial runout: 2.0 mm (0.08 in)

The wheel cannot be serviced and must be replaced if the above limits are exceeded.



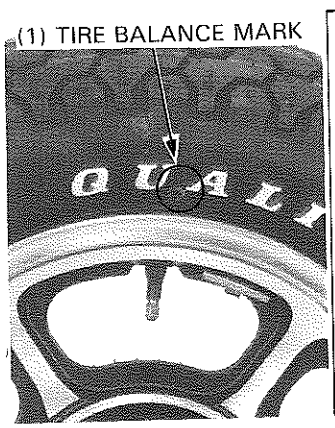
Wheel Balance

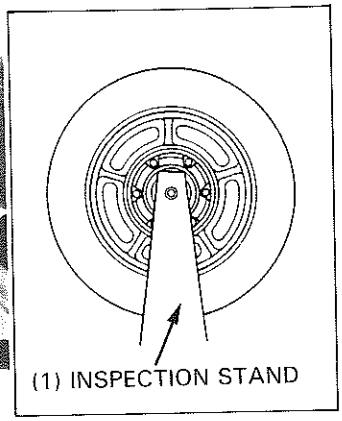
CAUTION

- *Wheel balance directly affects the stability, handling and overall safety of the motorcycle. Always check balance when the tire has been removed from the rim.*

NOTE

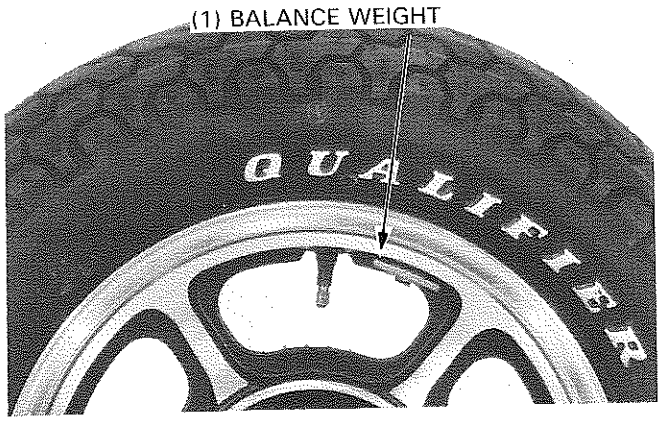
- For optimum balance, the tire balance mark (a paint dot on the side wall) must be located next to the valve stem. Remount the tire if necessary.





Remove the dust seal from the wheel.
Mount the wheel assembly in an inspection stand.
Spin the wheel, allow it to stop, and mark the lowest (heaviest) part of the wheel with chalk.
Do this two or three times to verify the heaviest area. If the wheel is balanced, it will not stop consistently in the same position.

To balance the wheel, install wheel weights on the highest side of the rim, the side opposite the chalk marks. Add just enough weight so the wheel will no longer stop in the same position when it is spun.
Do not add more than 70 grams to the rear wheel.



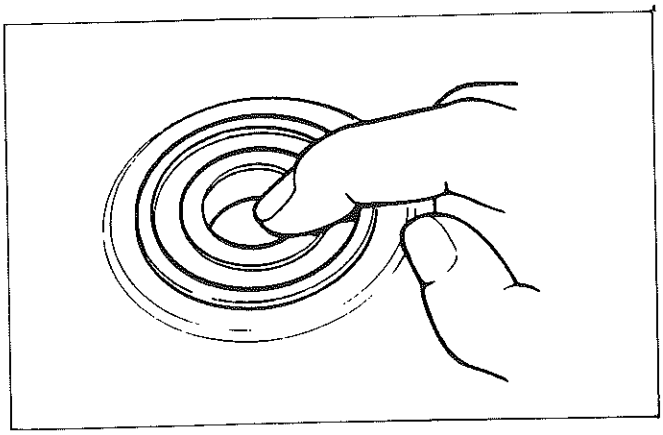
Wheel bearings
Turn the inner race of each bearing with your finger. The bearings should turn smoothly and quietly. Also check that the bearing outer race fits tightly in the hub.

Remove and discard the bearings if the races do not turn smoothly, quietly, or if they fit loosely in the hub.

NOTE

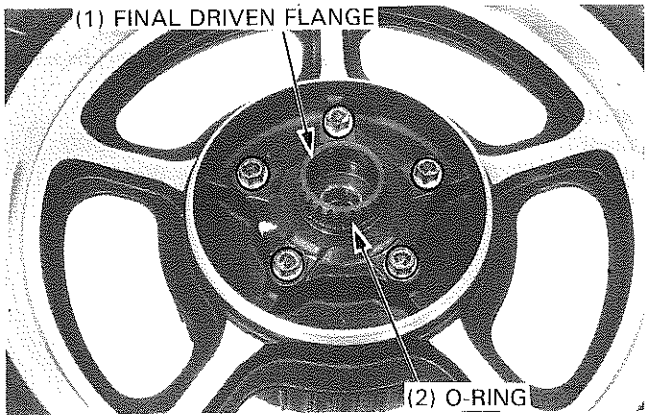
- Replace hub bearings in pairs.

For bearing replacement, see pages 16-5 and 6.



DISASSEMBLY

Remove the O-ring from the final driven flange.
Remove the final driven flange from the wheel hub by removing the five bolts.



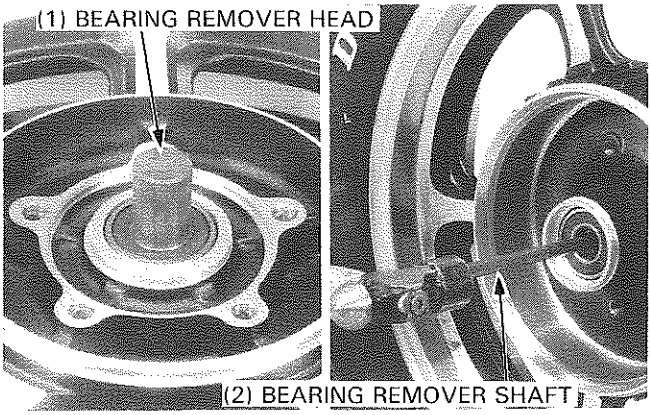
Install the bearing remover head into the bearing.
From the opposite side, install the bearing remover shaft and drive the bearing out of the wheel.
Remove the distance collar and other bearing.

NOTE

- If the bearings are removed, they must be replaced with new ones.

TOOLS:

Bearing remover shaft	**07746—0050100 or equivalent commercially available in U.S.A.**
Bearing remover head, 20 mm	**07746—0050600 or equivalent commercially available in U.S.A.**



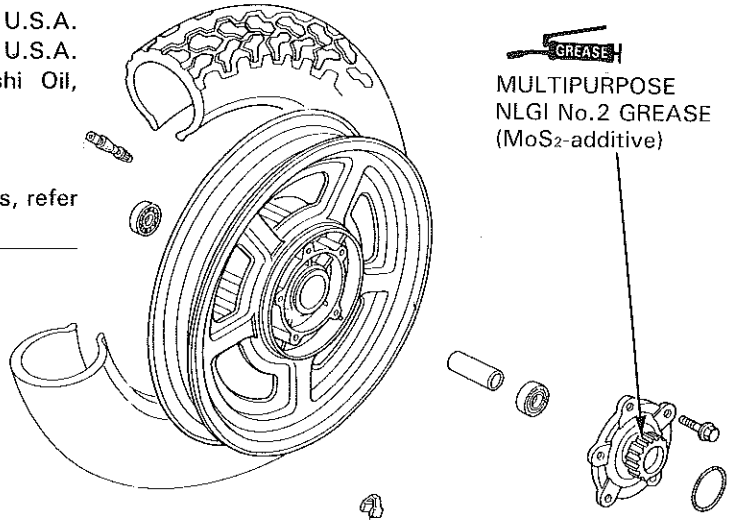
ASSEMBLY

NOTE

Use lithium-based multipurpose grease with MoS_2-additive as follows:

- Moly Lube 126 EP#0 manufactured by BEL-RAY Oil, U.S.A.
- MOLYKOTE BR2-S manufactured by Dow Corning, U.S.A.
- MULTIPURPOSE M-2 manufactured by Mitsubishi Oil, Japan.
- STA-LUBE NLGI, #2.
- Other lubricants of equivalent quality.

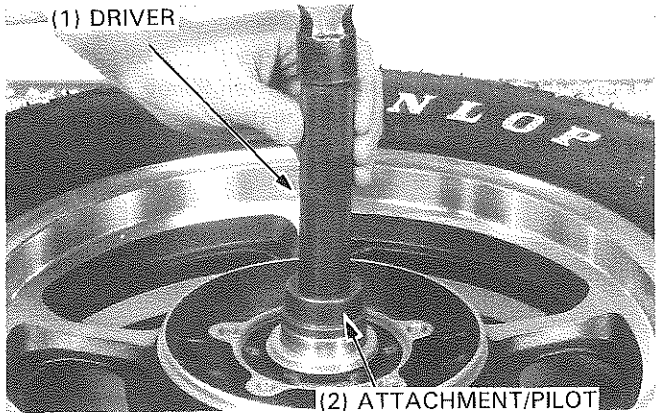
The wheel uses a tubeless tire. For tubeless tire repairs, refer to the Tubeless Tire Manual.



First, drive in a new right wheel bearing until it is fully seated, install the distance collar, then drive in a new left bearing.

TOOLS:

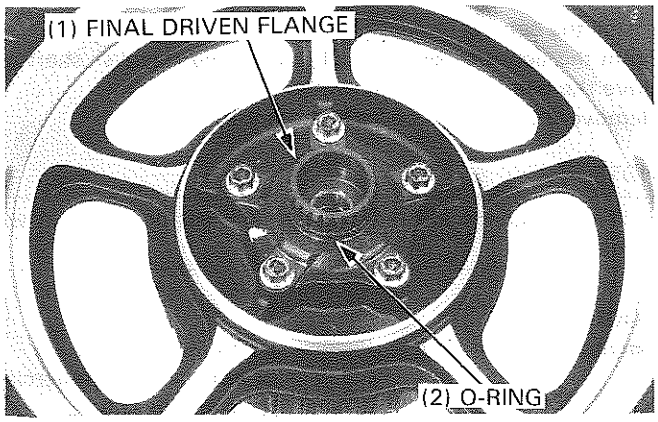
Driver	**07749—0010000**
Attachment, 42 x 47 mm	**07746—0010300**
Pilot, 20 mm	**07746—0040500**



Install the final driven flange onto the wheel hub.
Apply locking agent to the bolts threads and tighten the bolts.

TORQUE: 50—60 N·m (5.0—6.0 kg-m, 36—43 ft-lb)

Install a new O-ring onto the groove on the final driven flange.

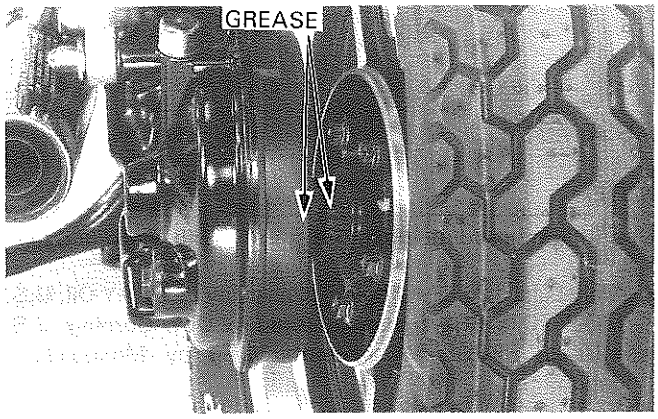


INSTALLATION

Apply Multipurpose NLGI No.2 grease (MoS_2-additive) to the final driven flange and ring gear engagement splines.

Loosen the final gear case attaching nuts to ease axle installation and to assure proper driven flange alignment.

Engage the rear wheel with the final drive case, making sure the splines are correctly aligned.



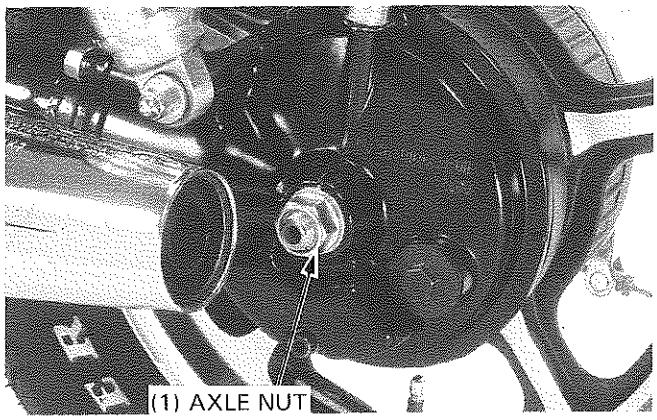
Insert the rear axle through the swingarm, side collar, brake panel, hub and final drive gear.

Tighten the axle nut.

TORQUE: 80—100 N·m (8.0—10.0 kg-m, 58—72 ft-lb)

Tighten the final gear case attaching nuts.

TORQUE: 60—70 N·m (6.0—7.0 kg-m, 43—51 ft-lb)

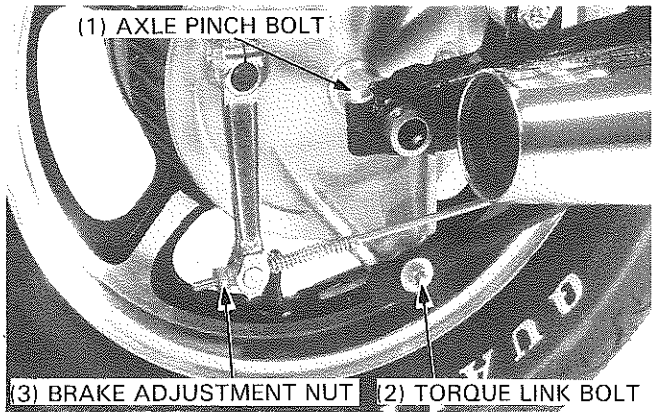


Tighten the axle pinch bolt.

TORQUE: 24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)

Place the brake rod through the brake arm pin and install the brake adjusting nut.
Tighten the brake torque link nut securely.

Install the cotter pin.
Adjust the rear brake (page 3-11).

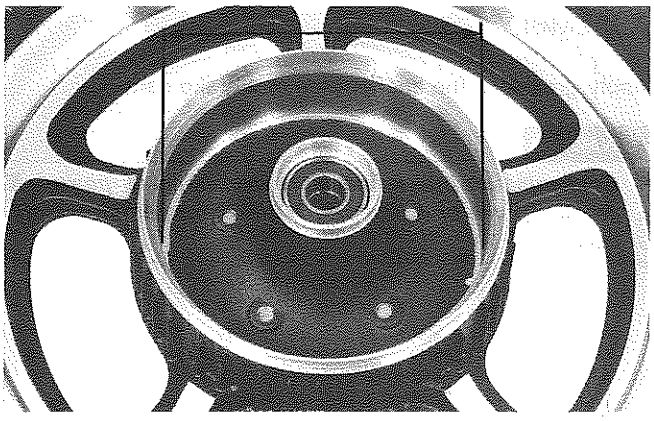


REAR BRAKE

Remove the rear wheel (page 16-3).

Remove the brake panel from the wheel hub.

INSPECTION

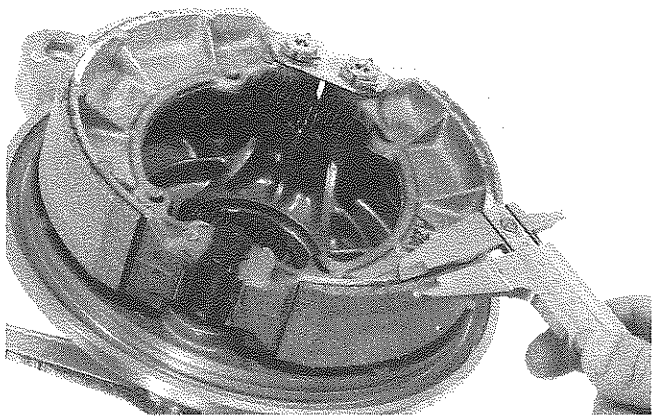


Brake drum
Measure the brake drum I.D.

SERVICE LIMIT: 181.0 mm (7.13 in)

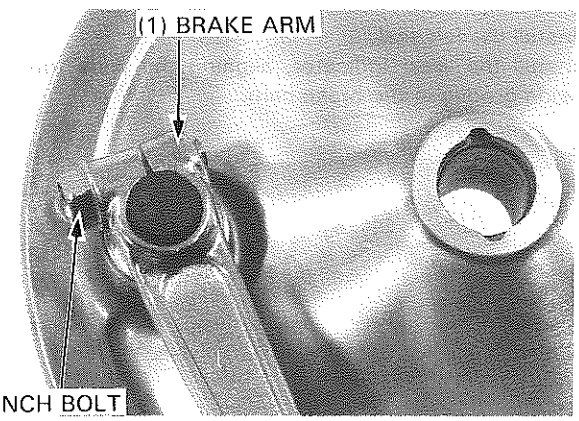
Lining thickness
Measure the rear brake lining thickness.

SERVICE LIMIT: 2.0 mm (0.08 in)

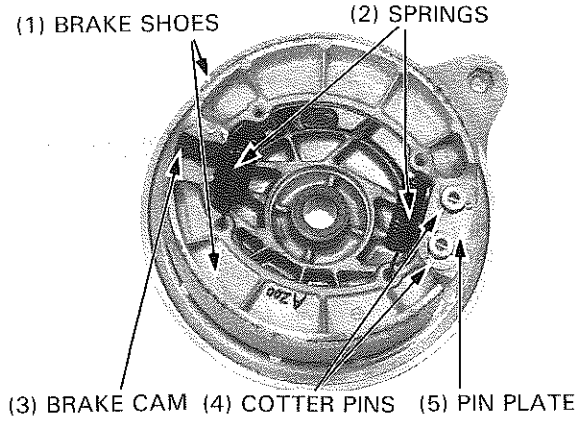


DISASSEMBLY

Remove the brake arm, wear indicator and felt seal.



Remove the cotter pins, brake shoes, springs and brake cam.

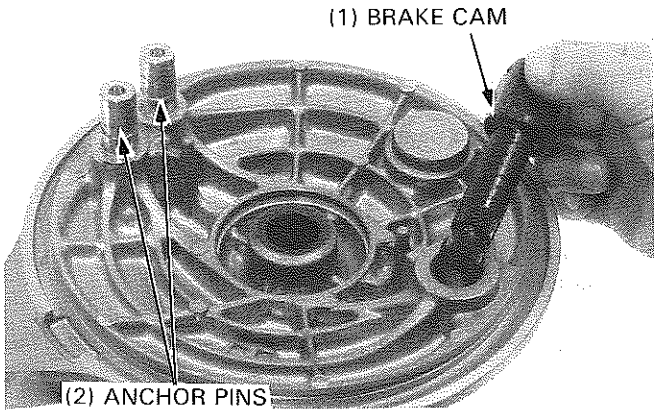


ASSEMBLY

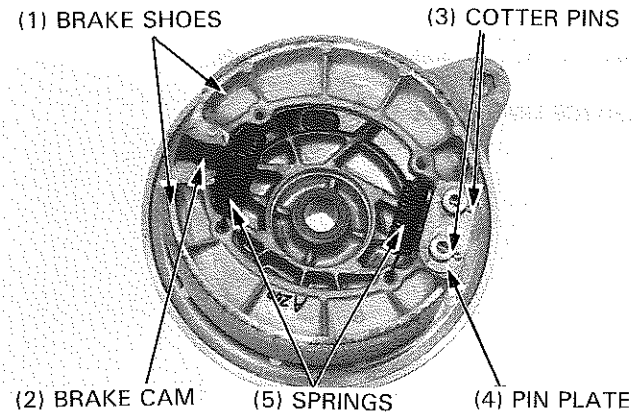
Apply grease to the anchor pins and brake cam.

WARNING

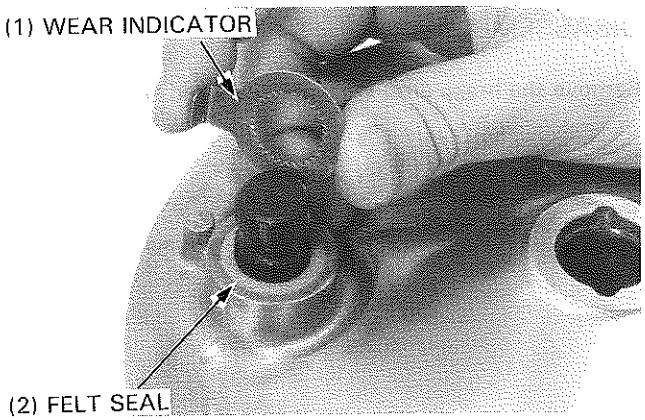
- ***Contaminated brake linings reduce stopping power. Keep grease off the brake linings. Wipe any excess grease off the cam.***



Assemble the brake shoes, springs and brake cam with the punch mark on the cam outward.
Install the brake shoe assembly onto the brake panel and secure it with the pin plate and new cotter pins.



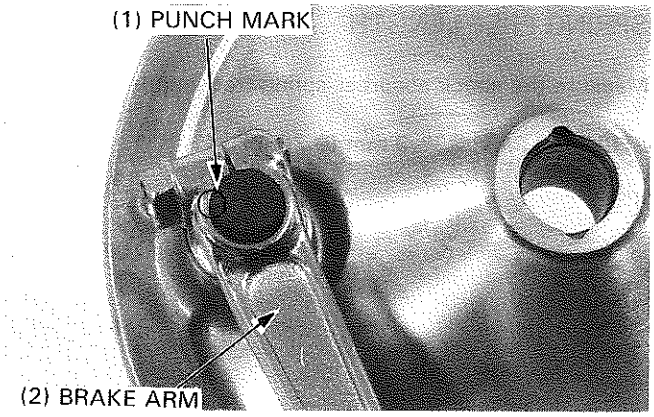
Install the felt seal.
Install the wear indicator, aligning the wide tooth with the wide groove in the brake cam.



Install the brake arm onto the brake cam, aligning the punch marks on the brake cam and arm.
Install and tighten the brake arm bolt.

TORQUE: 24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)

Install the brake panel into the wheel hub and install the rear wheel (page 16-6).



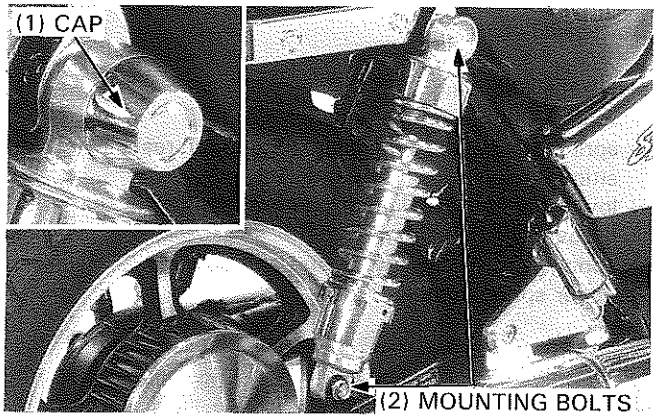
SHOCK ABSORBER

REMOVAL

NOTE

- Remove one shock absorber at a time to facilitate removal and installation.

Adjust the shock absorber to the softest position for disassembly.
Remove the following:
— upper mount cap
— shock absorber upper and lower mounts
— shock absorber



DISASSEMBLY

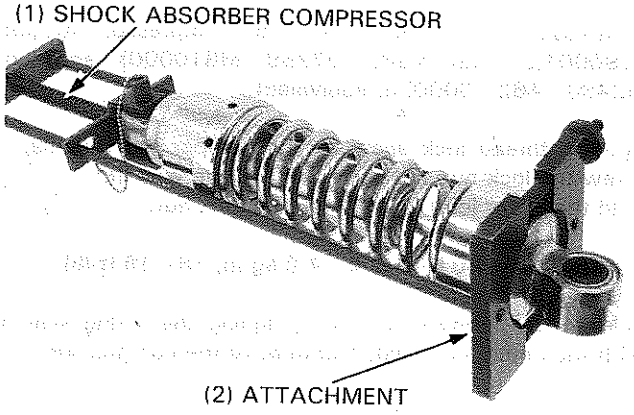
Replace base and guide of shock absorber compressor, with attachments.

TOOLS:

Shock absorber compressor	**07959—3290001**
Shock absorber attachment	**07959—MB10000**

Place the collar P/N 52486—463—0000 or equivalent in the shock's bottom joint before putting the shock in the compressor.

Set the shock in the compressor as shown and compress the spring 30 mm by turning the compressor handle.

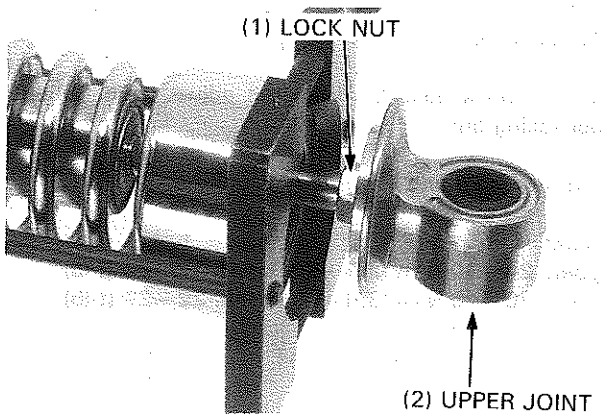


CAUTION

- *Be sure the base is adjusted correctly for the shock spring seat and the clevis pin is all the way in.*

Pull the damper rod out.
Loosen the lock nut and remove the upper joint and nut.

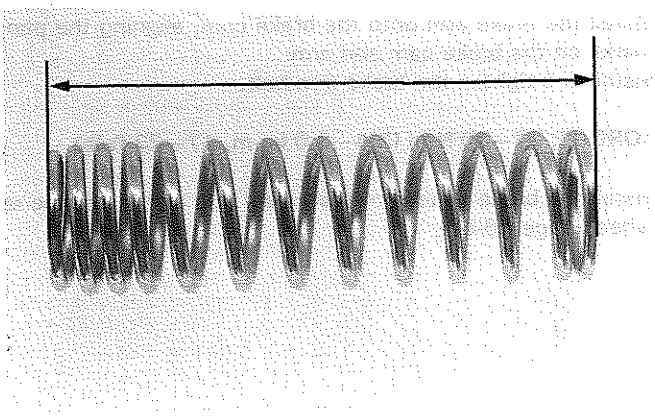
Remove the upper spring seat, spring, lower spring seat, spring adjuster and stopper rubber.



SPRING FREE LENGTH

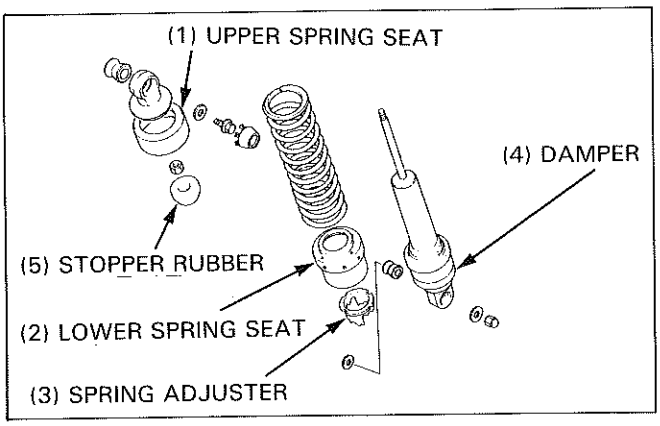
Measure the shock absorber spring free length.

SERVICE LIMIT: 235.3 mm (9.26 in)



ASSEMBLY

Install the following:
- stopper rubber onto the damper rod
- spring adjuster into the damper so that it rests in softest position
- lower spring seat aligning the lugs inside the seat with the grooves in the adjuster
- spring with the tightly wound end upward
- upper spring seat

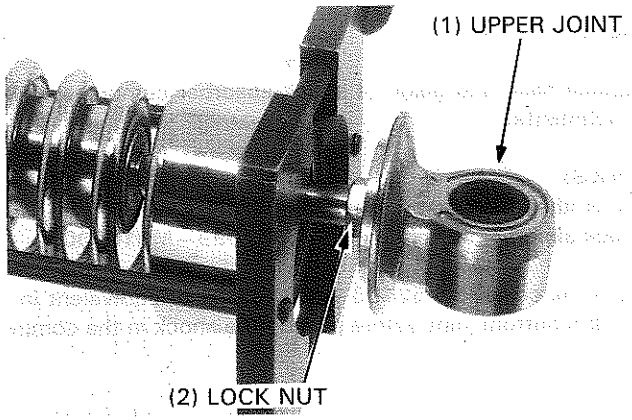


Compress the spring with the compressor (07959—3290001), attachment (07959—MB10000) and collar (52486—462—0000) or equivalent.

Apply a thread lock agent to the damper rod threads, and screw the lock nut and upper joint all the way in.
Hold the upper joint and tighten the lock nut.

TORQUE: 25—40 N·m (2.5—4.0 kg-m, 18—19 ft-lb)

Release the spring compressor,aligning the spring seat hole with the upper joint seat, and remove the compressor.



INSTALLATION

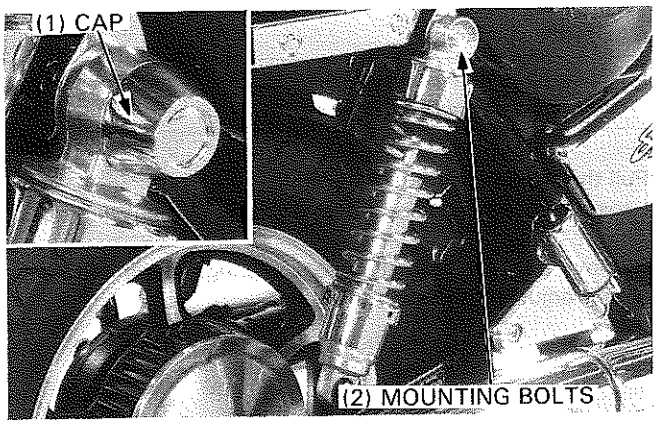
Install the shock absorber with the adjust indicator on the damper facing out.

Tighten the upper and lower mount bolts and nut.

TORQUE:
Upper: 24—30 N·m (2.4—3.0 kg-m, 17—22 ft-lb)
Lower: 30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)

Install the upper mount cap.

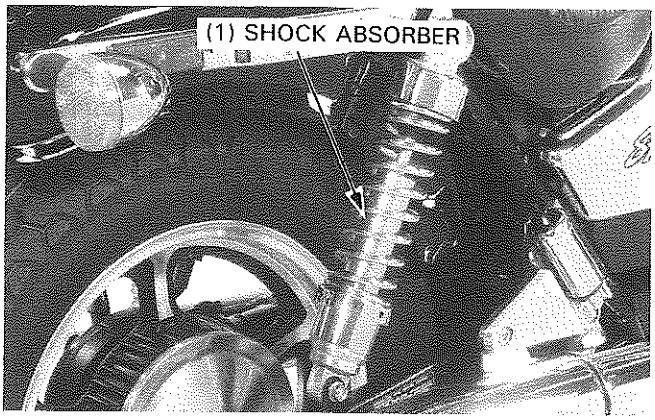
Adjust the shock absorber to the desired position.



SWINGARM

REMOVAL

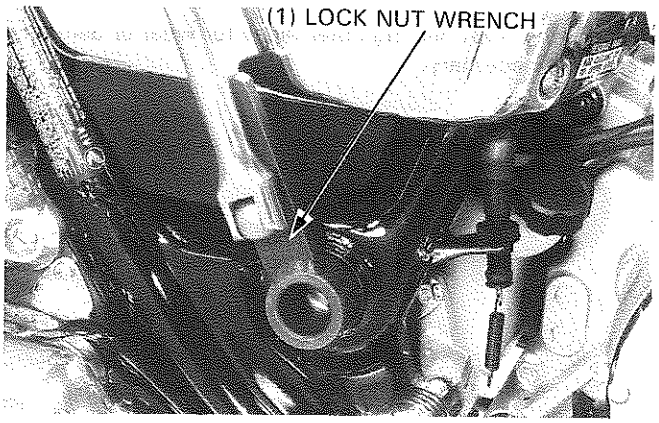
Remove the following:
— rear wheel (page 16-3)
— rear shock absorbers (page 16-9)
— final drive case (page 14-4)



Remove the swingarm pivot caps.

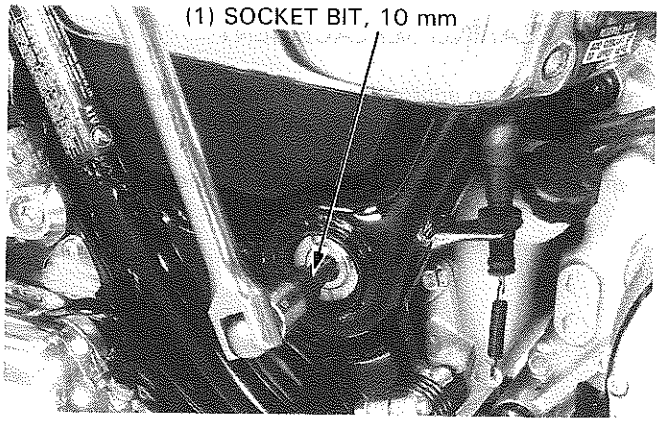
Loosen the right pivot lock nut.

TOOL:
Lock nut wrench **07908—ME90000**



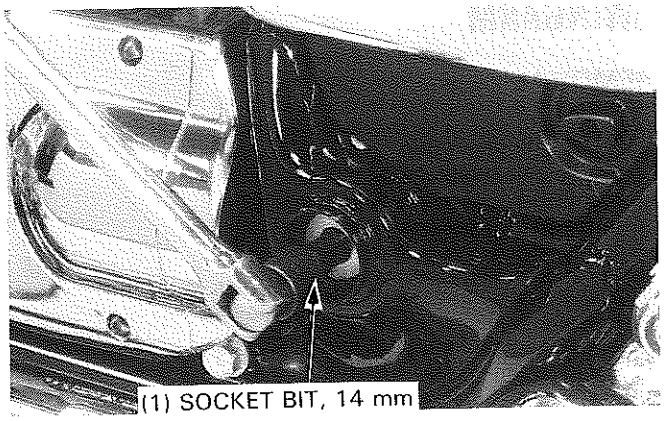
Remove the right pivot bolt.

TOOL:
Socket bit, 10 mm **07703—0020200 or equivalent commercially avilable in U.S.A.**

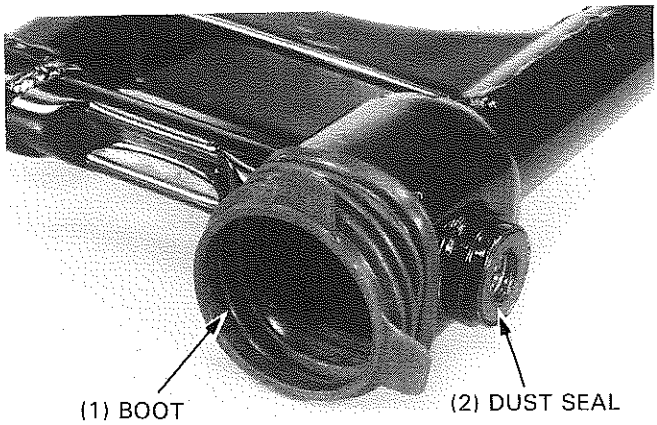


Remove the left pivot bolt and remove the swingarm.

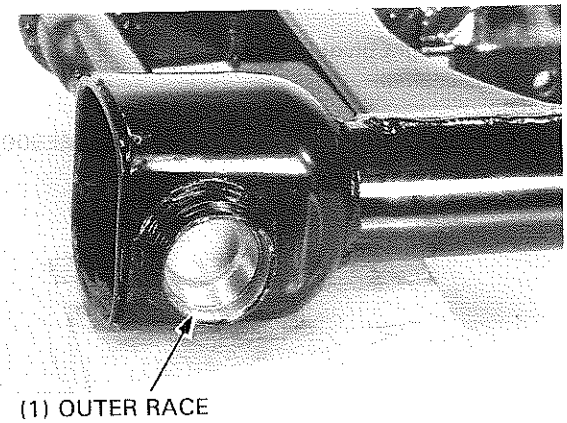
TOOL:
Socket bit, 14 mm — **07703—0020400 or equivalent commercially available in U.S.A.**



Remove the boot and dust seals from the swingam.
Remove the pivot bearings from the swingarm.

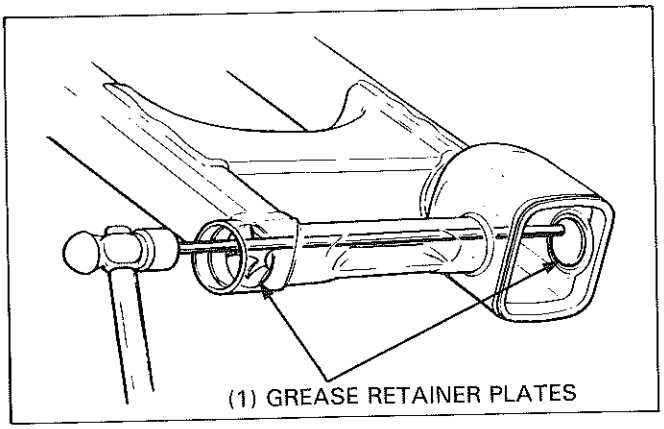


Inspect the pivot bearing outer races for wear or damage and replace if necessary.



PIVOT BEARING REPLACEMENT

Punch or drill an appropriate hole into a grease retainer plate.
Remove the outer race on the other side with grease retainer plate.
Remove the other race with grease retainer.



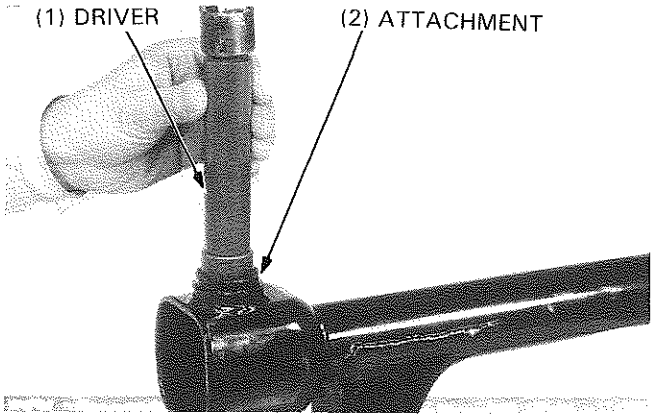
NOTE

- Replace the bearing inner and outer races as a set. Replace the grease retainer plate whenever it is removed.

Install new grease retainer plates and drive new bearing outer races into the swingarm pivot.

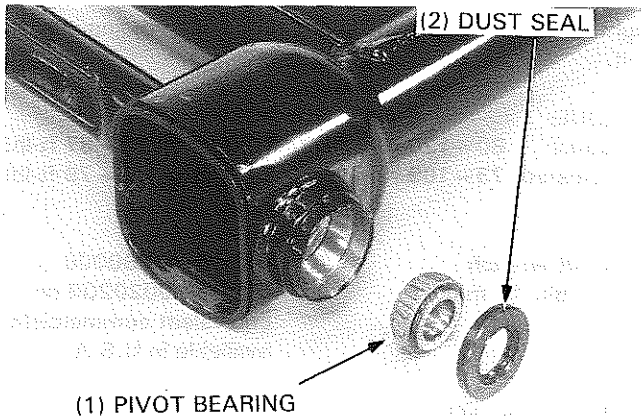
TOOLS:

Driver	**07749—0010000**
Attachment, 32 x 35 mm	**07746—0010100**



Apply grease to the pivot bearings and dust seals.

Install the bearings and dust seals into the swingarm pivots.

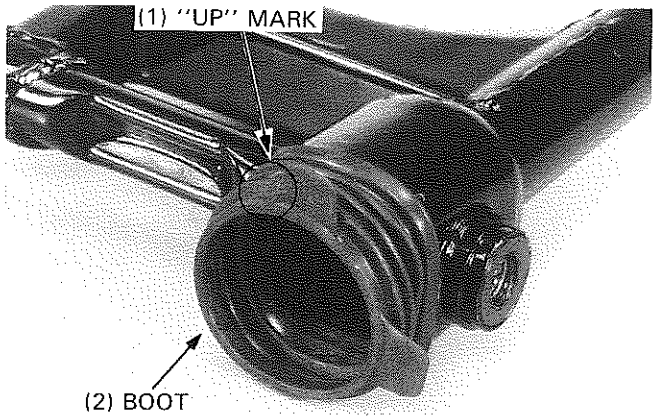


INSTALLATION

Install the boot onto the swingarm with the "UP" mark facing up.

Make sure that the universal joint is installed in position.

Coat the pivot bearings, dust seal lips and pivot bolt tips with grease, and install the swingarm and pivot bolts.



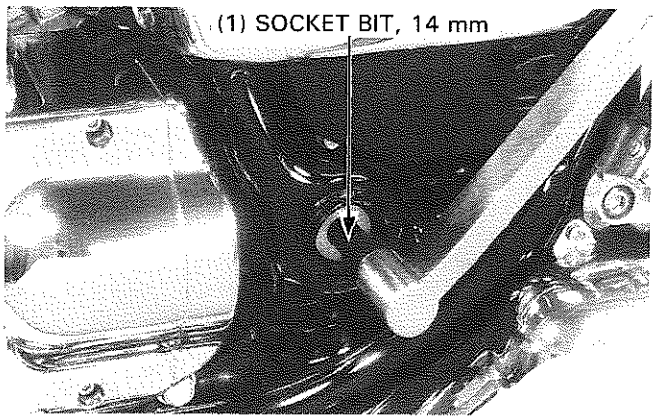
Tighten the left pivot bolt.

TORQUE: 80—120 N·m (8.0—12.0 kg-m, 58—87 ft-lb)

TOOL:

Socket bit, 14 mm	**07703—0020400 or equivalent commercially available in U.S.A.**

Install the left pivot cap.



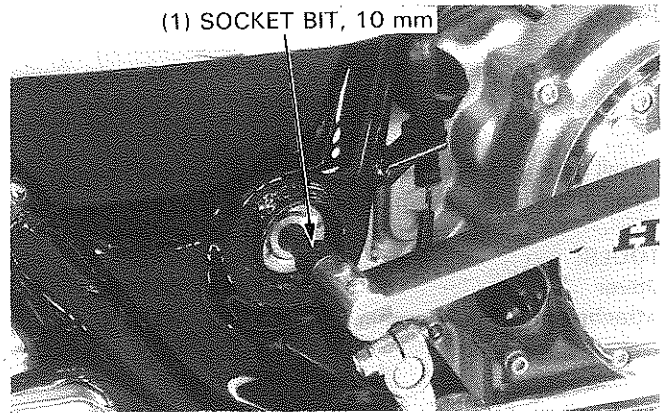
Tighten the right pivot bolt to 12 N·m (1.2 kg-m, 9 ft-lb), loosen it and retighten to the specified torque.

TORQUE: 8—12 N·m (0.8—1.2 kg-m, 6—9 ft-lb)

Move the swingarm up and down several times.
Retighten the right pivot bolt to the specified torque.

TOOL:

Socket bit, 10 mm	**07703—0020200 or equivalent commercially available in U.S.A.**

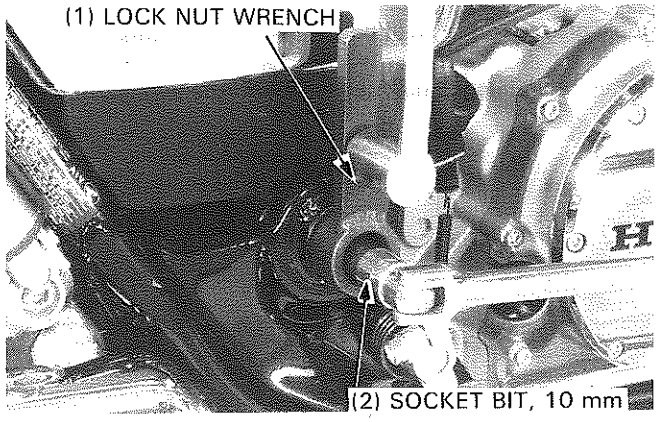


Tighten the right pivot bolt lock nut while holding the pivot bolt.

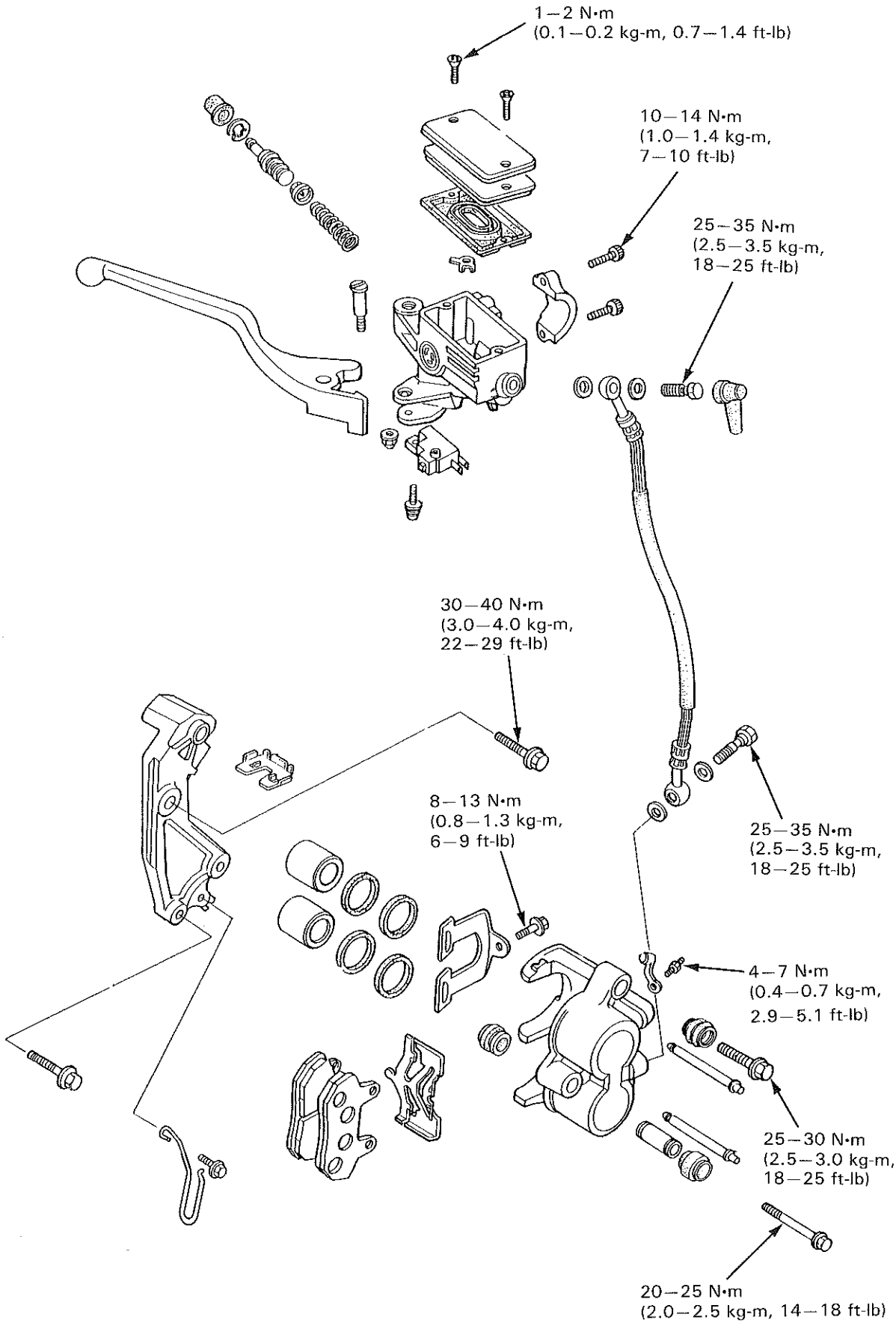
TORQUE:
Actual: 80—120 N·m (8.0—12.0 kg-m, 58—87 ft-lb)
Indicated: 73—109 N·m (7.3—10.9 kg-m, 53—79 ft-lb)

TOOLS:

Lock nut wrench	**07908—ME90000**
Socket bit, 10 mm	**07703—0020200 or equivalent commercially available in U.S.A.**



Install the following:
— final drive case (page 14-14)
— rear shock absorber (page 16-10)
— rear wheel (page 16-6)


1—2 N·m
(0.1—0.2 kg-m, 0.7—1.4 ft-lb)
10—14 N·m
(1.0—1.4 kg-m,
7—10 ft-lb)
25—35 N·m
(2.5—3.5 kg-m,
18—25 ft-lb)
30—40 N·m
(3.0—4.0 kg-m,
22—29 ft-lb)
8—13 N·m
(0.8—1.3 kg-m,
6—9 ft-lb)
25—35 N·m
(2.5—3.5 kg-m,
18—25 ft-lb)
4—7 N·m
(0.4—0.7 kg-m,
2.9—5.1 ft-lb)
25—30 N·m
(2.5—3.0 kg-m,
18—25 ft-lb)
20—25 N·m
(2.0—2.5 kg-m, 14—18 ft-lb)

SERVICE INFORMATION

GENERAL

- The brake calipers can be removed without disconnecting the hydraulic system.
- Bleed the hydraulic system if it has been disassembled or if the brake feels spongy.
- Do not allow foreign material to enter the system when filling the reservoir.
- Brake fluid will damage painted, plastic and rubber parts. Whenever handling brake fluid, protect the painted, plastic and rubber parts by covering them with a rag. If fluid does get on these parts, wipe it off with a clean cloth.
- Always check brake operation before riding the motorcycle.

SPECIFICATIONS

Unit: mm (in)

ITEM	STANDARD	SERVICE LIMIT
Front disc thickness	4.5—5.2 (0.18—0.20)	4.0 (0.16)
Front disc runout	——	0.30 (0.012)
Front master cylinder I.D.	14.000—14.043 (0.5512—0.5529)	14.055 (0.5533)
Front master piston O.D.	13.957—13.984 (0.5495—0.5506)	13.945 (0.5490)
Front caliper piston O.D.	31.948—31.998 (1.2578—1.2598)	31.940 (1.2575)
Front caliper cylinder I.D.	32.030—32.080 (1.2610—1.2630)	32.090 (1.2634)

TORQUE VALUES

Brake oil bolt	25—35 N·m (2.5—3.5 kg-m, 18—25 ft-lb)
Caliper mounting bolt	30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)
Caliper bracket bolt	20—25 N·m (2.0—2.5 kg-m, 14—18 ft-lb)
Caliper pin bolt	25—30 N·m (2.5—3.0 kg-m, 18—25 ft-lb)
Bleed valve	4—7 N·m (0.4—0.7 kg-m, 2.9—5.1 ft-lb)
Pad pin retainer bolt	8—13 N·m (0.8—1.3 kg-m, 6—9 ft-lb)
Master cylinder holder	10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)
Reservoir cover screw	1—2 N·m (0.1—0.2 kg-m, 0.7—1.4 ft-lb)

TOOL

Special

Snap ring pliers	07914—3230001

TROUBLESHOOTING

Brake lever soft or spongy
- Air bubbles in hydraulic system
- Low fluid level
- Hydraulic system leaking

Brake lever too hard
- Sticking piston(s)
- Clogged hydraulic system
- Pads glazed or excessively worn

Brake drag
- Hydraulic system sticking
- Sticking piston(s)
- Incorrect rear brake pedal adjustment

Brakes grab or pull to one side
- Pads contaminated
- One side of front brake faulty
- Disc or wheel misaligned

Brake chatter or squeal
- Pads contaminated
- Excessive disc runout
- Caliper installed incorrectly
- Disc or wheel misaligned

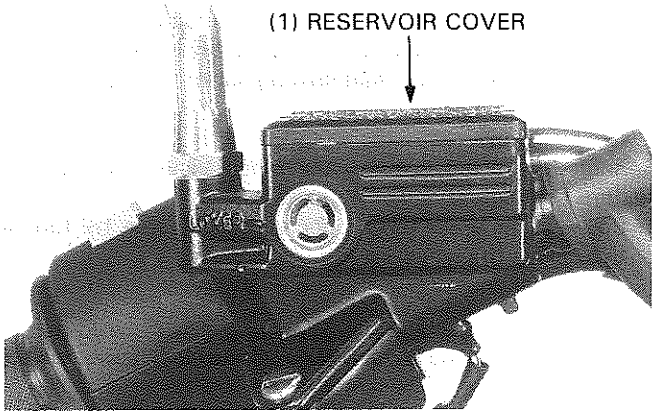
BRAKE FLUID REPLACEMENT/BLEEDING

WARNING

- ***A contaminated brake disc or pad reduces stopping power. Discard contaminated pads and clean the disc with a high quality brake degreasing agent.***

CAUTION

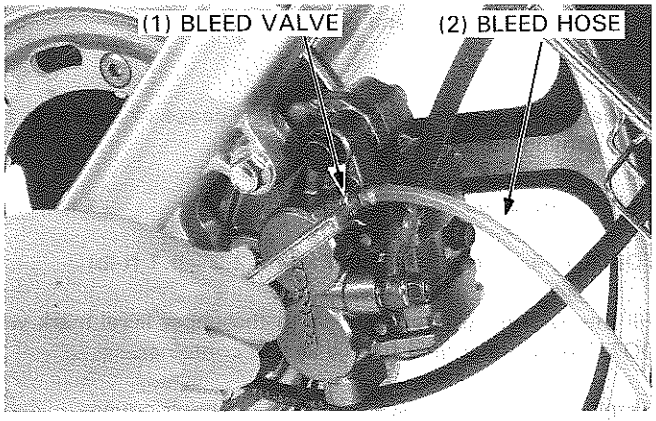
- *Do not allow foreign material to enter the system when filling the reservoir.*
- *Avoid spilling fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*



BRAKE FLUID DRAINING

With the fluid reservoir parallel to the ground, remove the reservoir cover, set plate and diaphragm.

Connect a bleed hose to the caliper bleed valve.
Loosen the bleed valve and pump the brake lever until no more fluid flows out of the bleed valve.



BRAKE FLUID FILLING/BLEEDING

Fill the master cylinder reservoir with DOT 3 or 4 brake fluid from a sealed container.

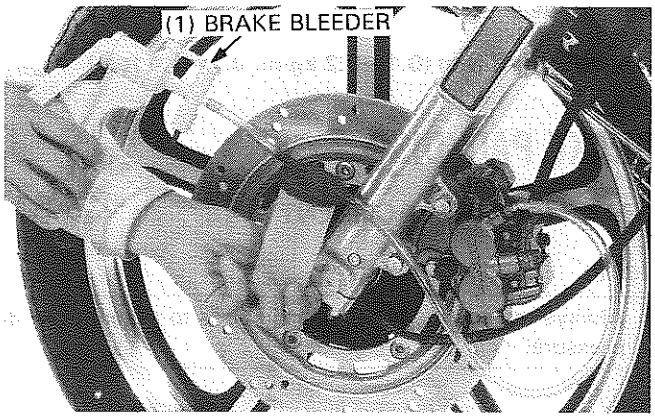
CAUTION

- *Do not mix different types of fluid. They are not compatible.*

Connect a commercially available brake bleeder to the bleed valve.
Pump the brake bleeder and loosen the bleed valve.
Add fluid when the fluid level in the master cylinder reservoir is low.

NOTE

- Check the fluid level often while bleeding the brake to prevent air from being pumped into the system.
- Use only DOT 3 or 4 brake fluid from a sealed container.
- When using a brake bleeding tool, follow the manufacturer's operating instructions.



Repeat the above procedures until air bubbles do not appear in the plastic hose.

NOTE

- If air is entering the bleeder from around the bleed valve threads, seal the threads with teflon tape.

Close the bleed valve and operate the brake lever. If it still feels spongy, repeat the above procedure.

If a brake bleeder is not available, use the following procedure: Pump up the system pressure with the brake lever until there are no air bubbles in the fluid flowing out of the reservoir small hole.

Connect the bleed hose to the bleed valve and bleed the system as follows:

1. Squeeze the brake lever, open the bleed valve 1/2 turn and then close the bleed valve.

NOTE

- Do not release the brake lever until the bleed valve has been closed.

2. Release the brake lever slowly and wait several seconds after it reaches the end of its travel.

Repeat steps 1 and 2 until air bubbles cease to appear in the fluid coming out of the bleed valve.

Tighten the bleed valve.

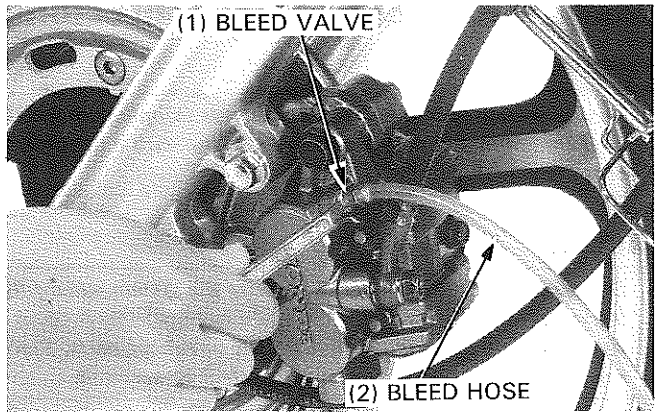
TORQUE: 4—7 N·m (0.4—0.7 kg-m, 2.9—5.1 ft-lb)

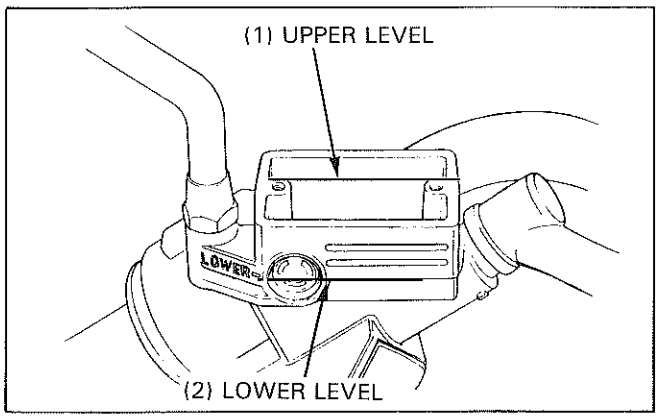
Fill the master cylinder resevoir to the upper level mark with DOT 3 or 4 brake fluid from a sealed container.

Install the diaphragm, set plate and reservoir cover.

Tighten the reservoir cover screws.

TORQUE: 1—2 N·m (0.1—0.2 kg-m, 0.7—1.4 ft-lb)





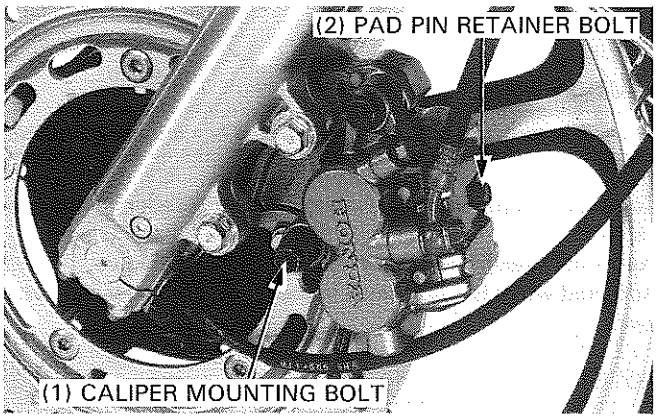
BRAKE PAD/DISC

BRAKE PAD REPLACEMENT

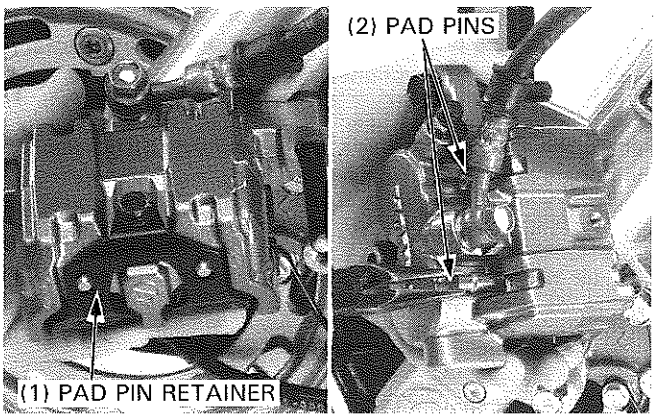
NOTE

- Always replace the brake pads in pairs to assure even disc pressure.

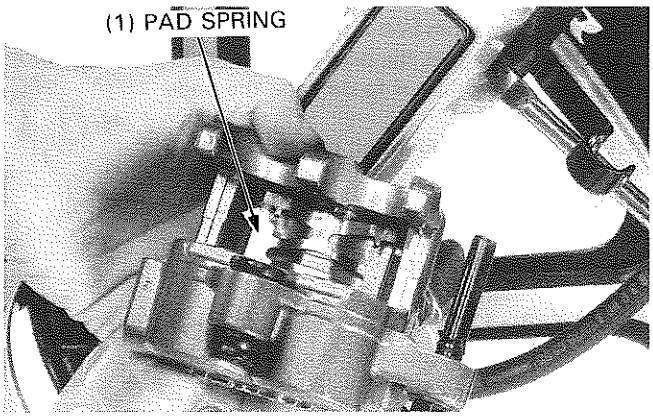
Loosen the pad pin retainer bolt.
Remove the caliper mounting bolt.
Pivot the caliper up out of the way and remove the caliper from the bracket.



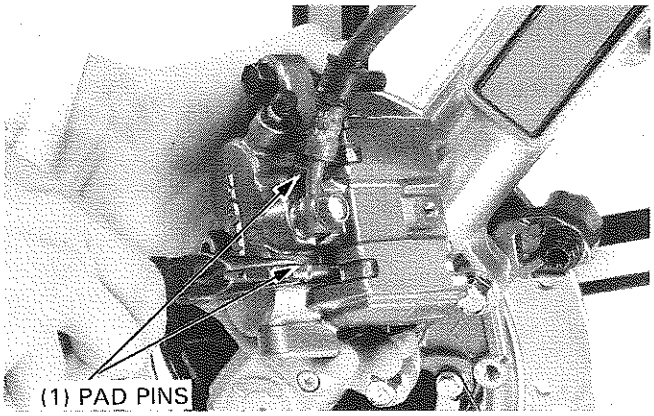
Remove the pad pin retainer bolt and retainer, and pull the pad pins out of the caliper.
Remove the brake pads.



Make sure that the pad spring is installed in the position shown.



Install new pads in the caliper.
Install one pad pin first, then install the other pin by pushing the pads against the caliper to depress the pad spring.

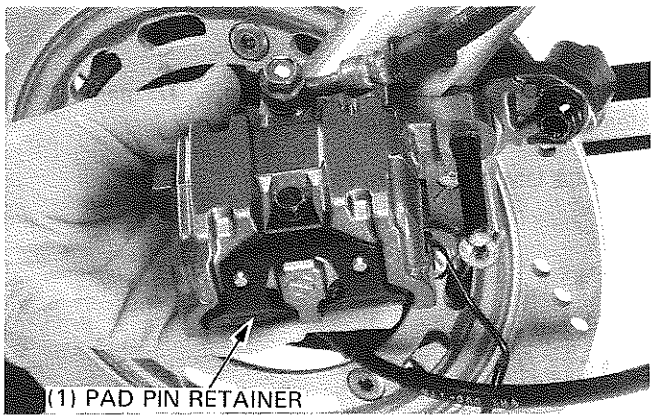


Push the caliper pistons in all the way.

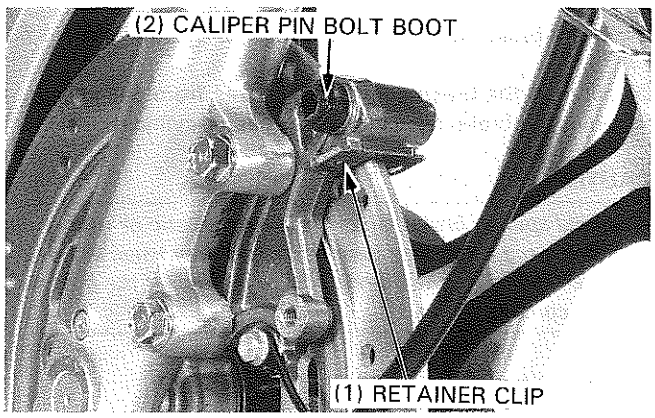
CAUTION

- *Be careful that the master cylinder does not overflow when the caliper pistons are compressed.*
- *Brake fluid can cause damage to painted, plastic or rubber surfaces.*

Place the pad pin retainer over the pad pins.
Push the retainer down to secure the pins.
Install the pad pin retainer bolt.



Apply silicone grease to the caliper pin bolt boot and caliper pin bolt.
Make sure that the retainer clip is in position on the caliper bracket.



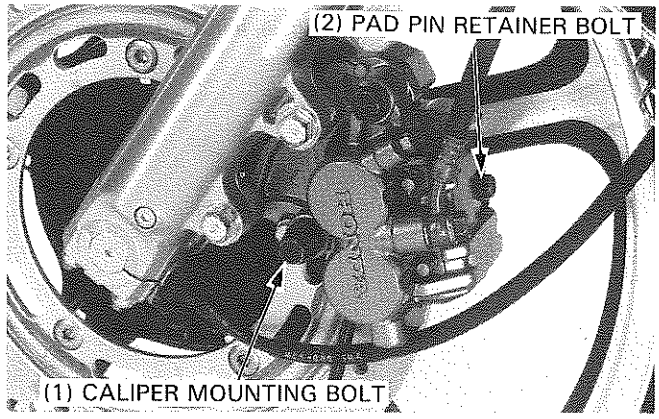
Insert the caliper pin bolt into the caliper bracket and pivot the caliper down so that the brake disc is positioned between the pads, being careful not to damage the pads.

Install the caliper mounting bolt and tighten it.

TORQUE: 30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)

Tighten the pad pin retainer bolt.

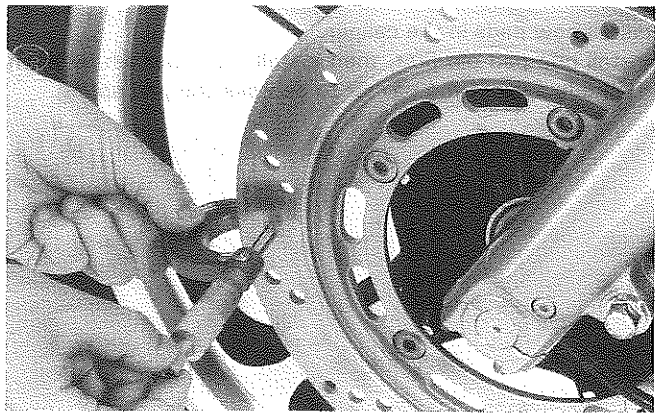
TORQUE: 8—13 N·m (0.8—1.3 kg-m, 6—9 ft-lb)



DISC THICKNESS

Measure the thickness of each disc.

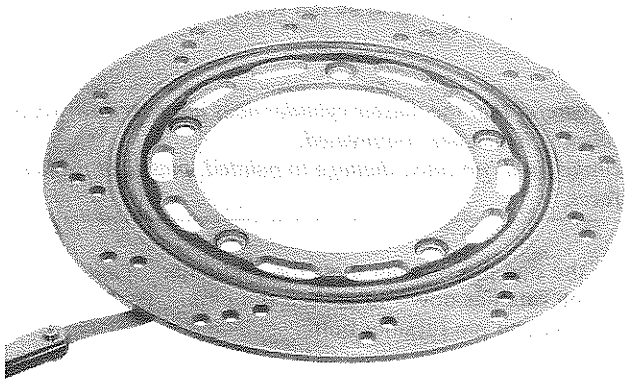
SERVICE LIMIT: 4.0 mm (0.16 in)



DISC WARPAGE

Remove the brake discs from the front wheel (page 15-7).
Measure the brake disc for warpage.

SERVICE LIMIT: 0.30 mm (0.012 in)



MASTER CYLINDER

REMOVAL

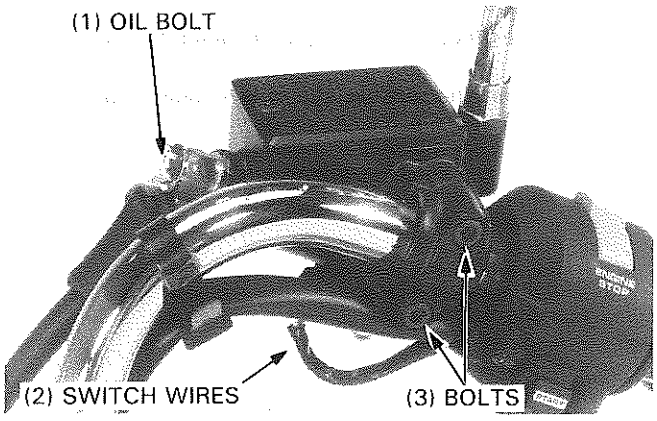
Drain the brake fluid from the hydraulic system (page 17-3).

Disconnect the brake light switch wires from the switch.
Remove the brake hose from the master cylinder.

CAUTION

- *Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*
- *When removing the oil bolt, cover the end of the hose to prevent contamination.*

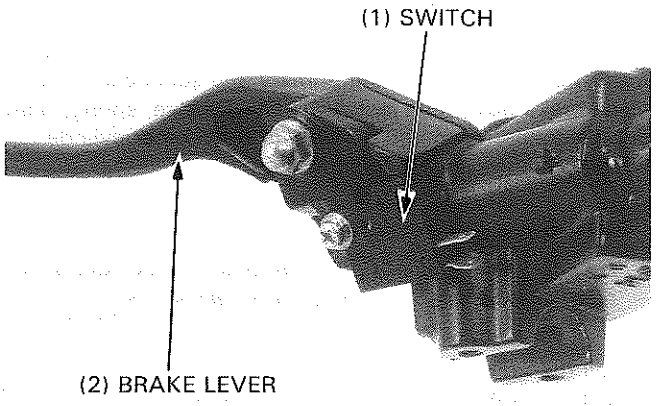
Remove the rear view mirror.
Remove the master cylinder and holder.



DISASSEMBLY

Remove the brake lever by removing the lock nut and pivot bolt.

Remove the brake light switch by removing the screw.

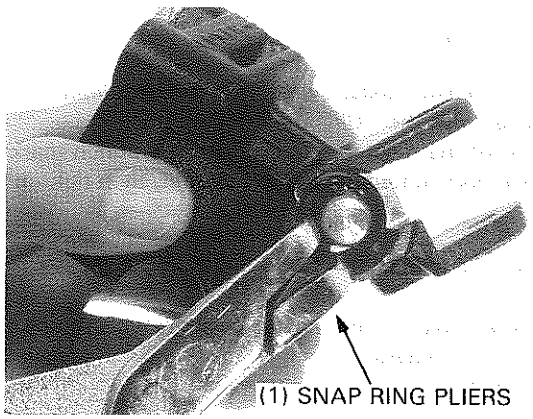


Remove the snap ring from the master cylinder.

TOOL:
Snap ring pliers **07914—3230001**

Remove the master piston, primary cup, spring and check valve from the master cylinder.

Clean the master cylinder, reservoir and master piston in clean brake fulid.



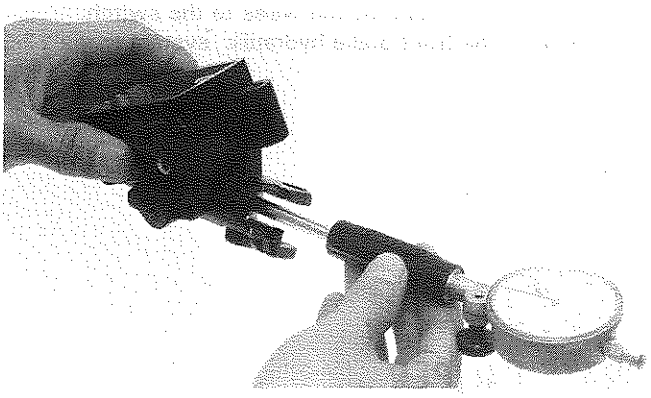
INSPECTION

Check the primary and secondary cups for wear, deterioration or damage.

Check the master cylinder and piston for scoring or other damage.

Measure the master cylinder inside diameter.

SERVICE LIMIT: 14.055 mm (0.5533 in)

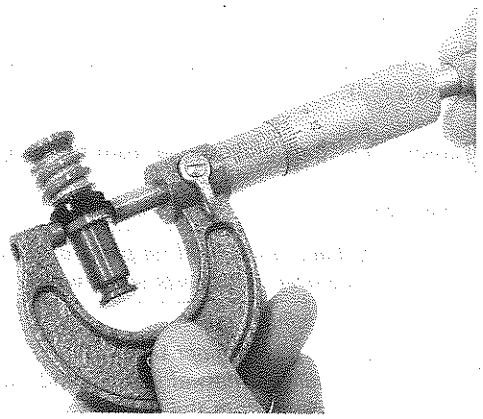


Measure the master piston outside diameter.

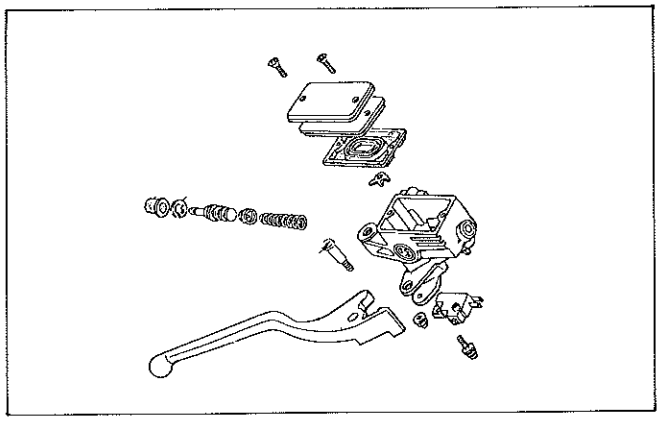
SERVICE LIMIT: 13.945 mm (0.5490 in)

NOTE

- The master piston, piston cups and spring must be replaced as a set.



ASSEMBLY



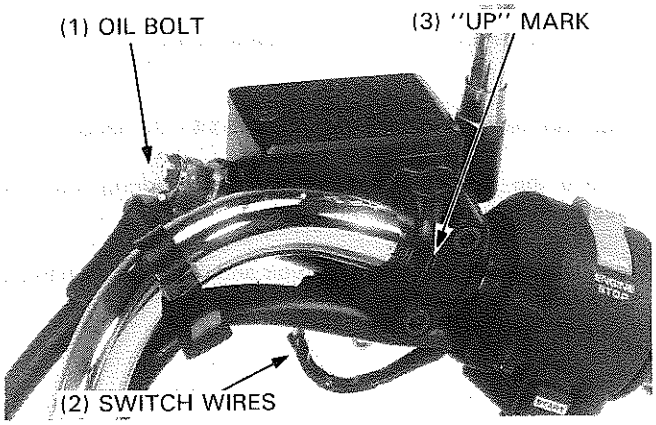
Coat the master piston and primary and secondary cups with clean brake fluid, then install the check valve, spring, primary cup, secondary cup and piston into the master cylinder.
Install the snap ring and piston boot.

CAUTION

- *Do not allow the lips of the cups to turn inside out and be certain the snap ring is firmly seated in the groove.*

Install the brake light switch.
Install the brake lever and rear view mirror.

INSTALLATION



Place the front brake master cylinder on the handlebar and install the holder with the "UP" mark facing up.
Align the end of the master cylinder with the punch mark on the handlebar, and tighten the upper bolt first, then tighten the lower bolt.

TORQUE: 10—14 N·m (1.0—1.4 kg-m, 7—10 ft-lb)

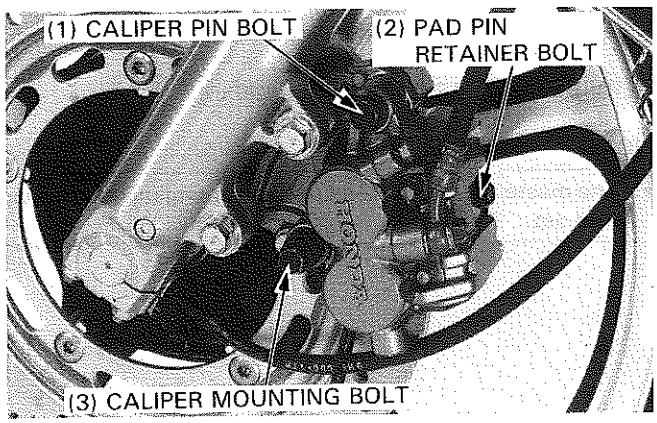
Install the brake hose to the master cylinder with the oil bolt and two sealing washers.
Tighten the oil bolt.

TORQUE: 25—35 N·m (2.5—3.5 kg-m, 18—25 ft-lb)

Connect the brake light switch wires to the switch.
Fill and bleed the front brake hydraulic system (page 17-3).

BRAKE CALIPER

REMOVAL



Drain the brake fluid from the front brake hydraulic system (page 17-3).

Remove the front brake hose from the caliper.

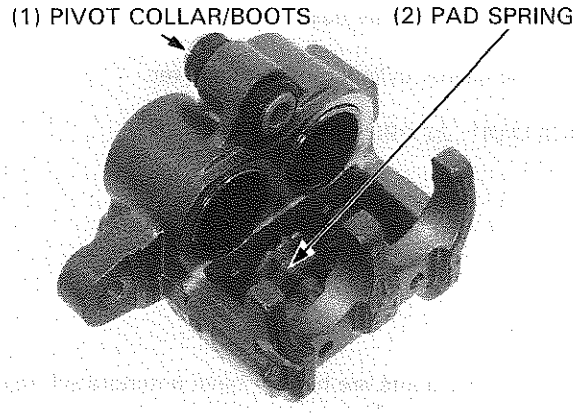
CAUTION

- *Avoid spilling brake fluid on painted, plastic or rubber parts. Place a rag over these parts whenever the system is serviced.*

Loosen the pad pin retainer bolt.
Remove the caliper mounting bolt and caliper pin bolt, and remove the caliper from the bracket.

DISASSEMBLY

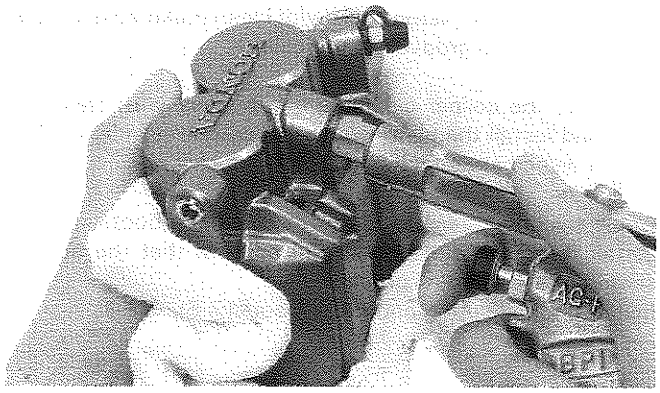
Remove the following:
— brake pads (page 17-4)
— pad spring
— caliper pivot collar and boots



Position the caliper with the pistons down and apply small squirts of air pressure to the fluid inlet to remove the pistons.

WARNING

- ***Do not use high pressure air or bring the nozzle too close to the inlet.***
- ***Place a shop towel over the pistons to prevent them from becoming projectile.***

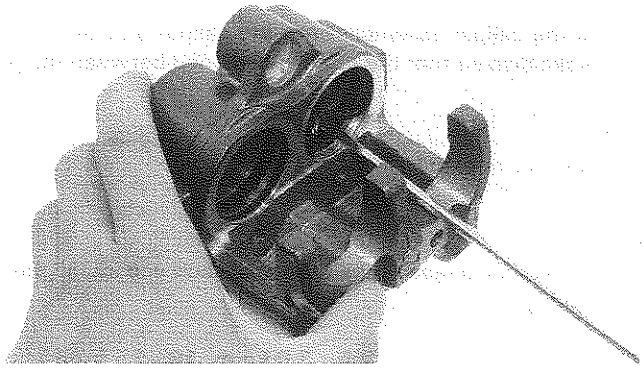


Push the dust and piston seals in and lift them out.

Clean the seal grooves with clean brake fluid.

CAUTION

- *Be careful not to damage the piston sliding surfaces.*

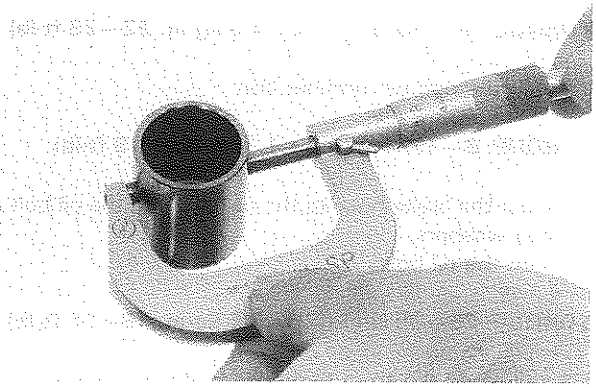


INSPECTION

Check the caliper pistons for scoring or other damage.

Measure the caliper piston outside diameter.

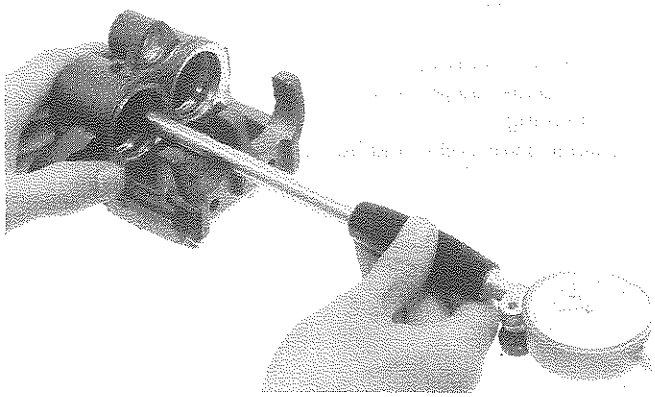
SERVICE LIMIT: 31.940 mm (1.2575 in)



Check the caliper cylinder bores for scoring or other damage.

Measure the caliper cylinder inside diameter.

SERVICE LIMIT: 32.090 mm (1.2634 in)



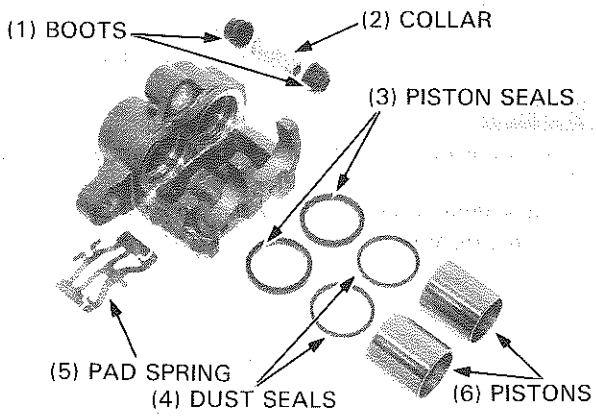
ASSEMBLY

If the pivot collar boots are hard or have deteriorated, replace them with new ones. The dust and piston seals must be replaced with new ones whenever they are removed.

Coat the dust and piston seals with clean brake fluid and install them in the seal grooves in the caliper.

Lubricate the caliper cylinders and pistons with clean brake fluid and install the pistons into the caliper cylinders with the piston dished ends facing the pads.

Apply silicone grease to the pivot collar and boots.
Install the collar and boots, making sure that the boots are seated in the grooves properly.
Install the pad spring and pads (page 17-5).



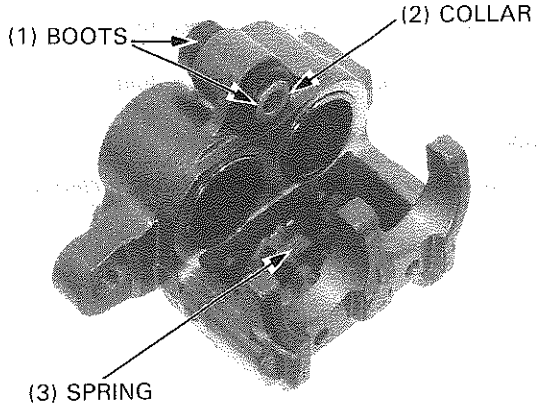
INSTALLATION

Apply silicone grease to the caliper pin bolt boot.

Install the caliper assembly onto the caliper bracket and over the brake disc so that the disc is positioned between the pads.

NOTE

- Use care not to damage the pads.



Apply silicone grease to the caliper pin bolt and install the caliper pin bolt.

TORQUE: 25—30 N·m (2.5—3.0 kg-m, 18—25 ft-lb)

Install and tighten the caliper mounting bolt.

TORQUE: 30—40 N·m (3.0—4.0 kg-m, 22—29 ft-lb)

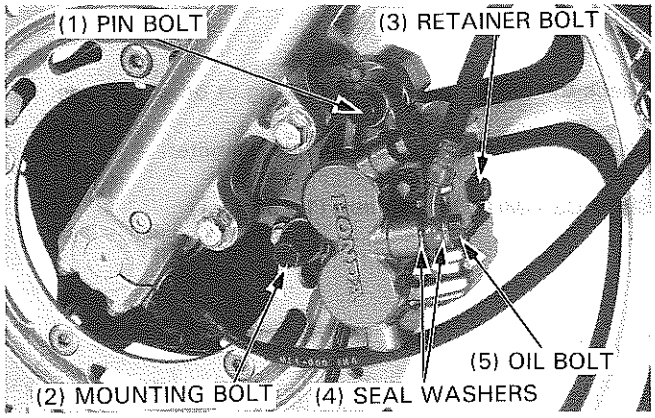
Tighten the pad pin retainer bolt.

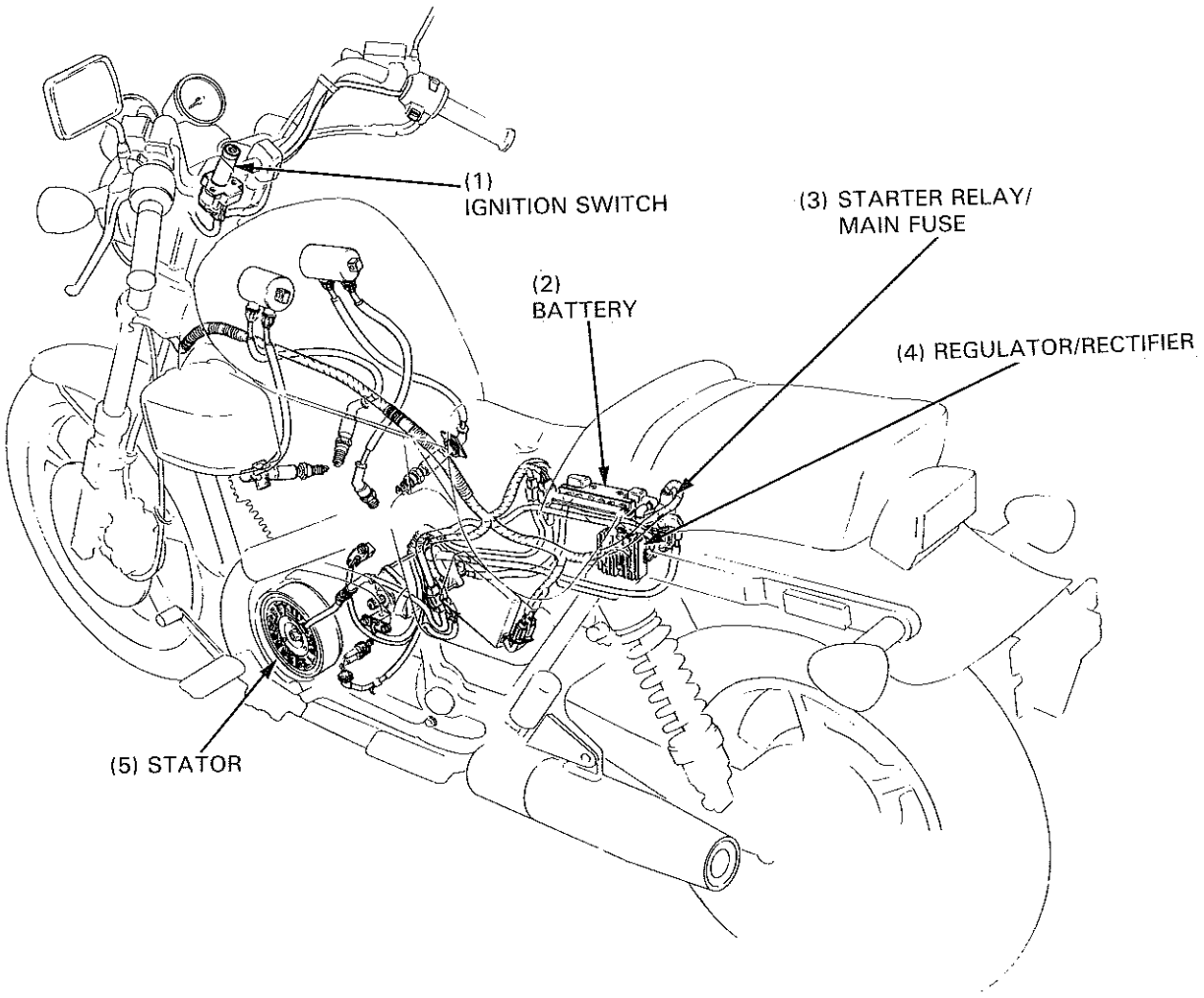
TORQUE: 8—13 N·m (0.8—1.3 kg-m, 6—9 ft-lb)

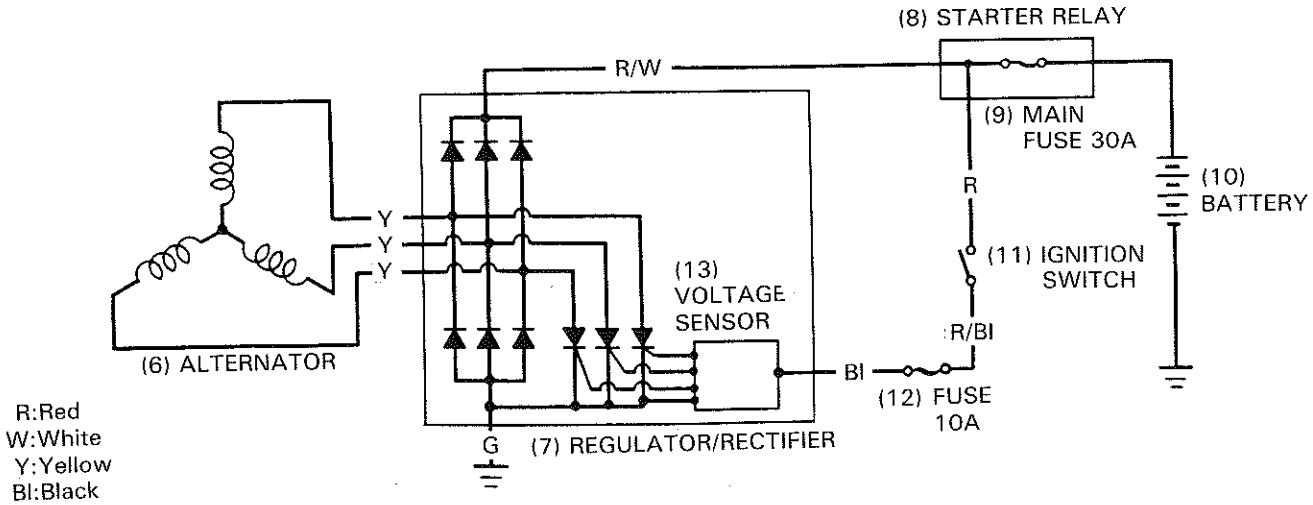
Connect the brake hose to the caliper with the oil bolt and two sealing washers.
Tighten the oil bolt.

TORQUE: 25—35 N·m (2.5—3.5 kg-m, 18—25 ft-lb)

Fill and bleed the front hydraulic brake system (page 17-3).




(1)
IGNITION SWITCH
(3) STARTER RELAY/
MAIN FUSE
(2)
BATTERY
(4) REGULATOR/RECTIFIER
(5) STATOR


(8) STARTER RELAY
R/W
(9) MAIN
FUSE 30A
(10)
BATTERY
R
(11) IGNITION
SWITCH
R/Bl
Bl
(12) FUSE
10A
Y
Y
Y
(13)
VOLTAGE
SENSOR
(6) ALTERNATOR
G
(7) REGULATOR/RECTIFIER
R:Red
W:White
Y:Yellow
Bl:Black

18. BATTERY/CHARGING SYSTEM

SERVICE INFORMATION

GENERAL

- Battery fluid level should be checked regularly. Fill with distilled water when necessary.
- Quick charge a battery only in an emergency. Slow-charging is preferred.
- Remove the battery from the motorcycle when charging. If the battery must be charged on the motorcycle, disconnect the battery cables.

WARNING

- ***Do not smoke, and keep flames away from a charging battery. The gas produced by a battery will explode if flames or sparks are brought near.***

- All charging system components can be tested on the motorcycle.
- Alternator removal is in Section 8.

SPECIFICATIONS

ITEM			STANDARD
Battery	Capacity		12 V—14 AH
	Specific gravity at 20°C (68°F)	Fully charged	1.270—1.290
		Needs charging	Below 1.260
	Charging current		1.4 amperes max.
Alternator capacity			340 W/5,000 rpm
Regulator/rectifier	Type		Transistorized, non-adjustable
	Regulated voltage		14—15 V
Charging start rpm (at no load)			1,000 rpm
Stator coil resistance			0.3—0.5 Ω (20°C/68°F)

TROUBLESHOOTING

No power—key turned on
- Dead battery
  - — Low fluid level
  - — Low specific gravity
  - — Charging system failure
- Disconnected battery cable
- Main fuse burned out
- Faulty ignition switch

Low power—key turned on
- Weak battery
  - — Low fluid level
  - — Low specific gravity
  - — Charging system failure
- Loose battery connection

Low power—engine running
- Battery undercharged
  - — Low fluid level
  - — One or more dead ceils
- Charging system failure

Intermittent power
- Loose battery connection
- Loose charging system connection
- Loose starting system connection
- Loose connection or short circuit in ignition system
- Loose connection or short circuit in lighting system

Charging system failure
- Loose, broken, or shorted wire or connection
- Faulty voltage regulator/rectifier
- Faulty alternator

BATTERY

REMOVAL

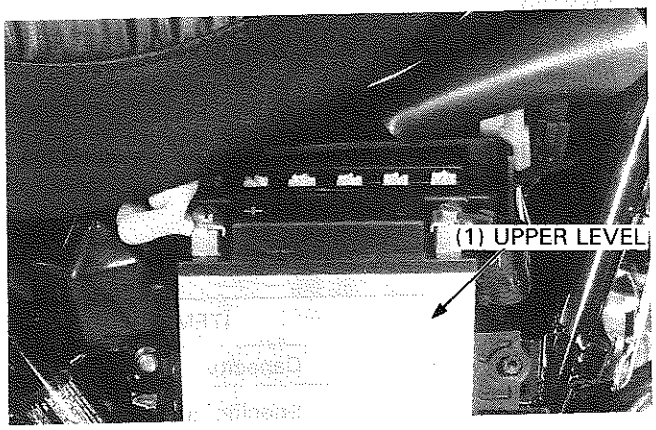
Remove the right side cover.
Remove the battery holder bolt.
Remove the battery negative cable from the battery, then the positive cable.
Disconnect the battery breather tube from the battery and remove the battery.

INSPECTION

Check for cracked or broken case or plates. Check the plates for sulfation.

Replace the battery if damaged or sulfated.

Check each cell's electrolyte level. If low, add distilled water to bring the level to the upper mark.



NOTE

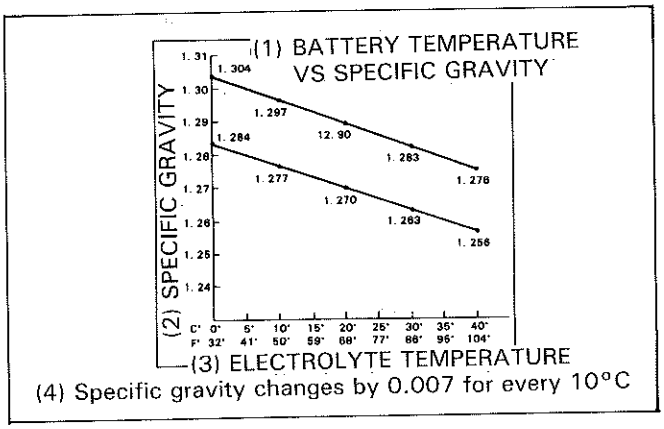
- In order to obtain accurate test reading when checking the charging system, the battery must be fully charged and in good condition. Perform the following inspections and tests before attempting to troubleshoot charging system problems.

SPECIFIC GRAVITY

The specific gravity must be checked with a hydrometer. Test each cell by drawing electrolyte into the hydrometer.

Fully Charged: 1.270—1.290 at 20°C (68°F)
Needs Charging: Below 1.260 at 20°C (68°F)

Make sure the variation between the high and low cells is less than 0.05.



(4) Specific gravity changes by 0.007 for every 10°C

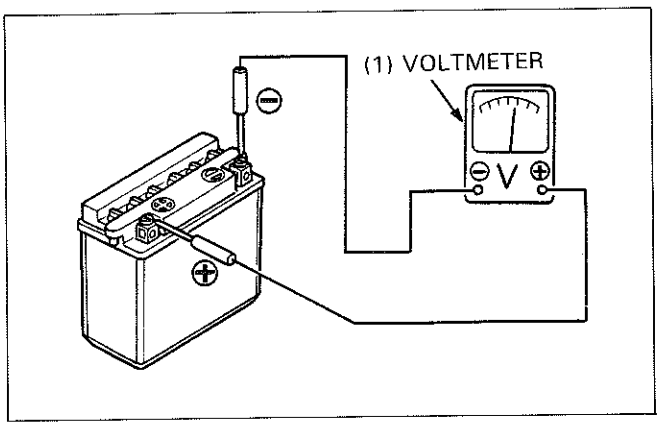
WARNING

- ***The battery electrolyte contains sulfuric acid. Avoid contact with skin, eyes, or clothing. If electrolyte gets in your eyes; flush them thoroughly with water get prompt medical attention.***

BATTERY VOLTAGE

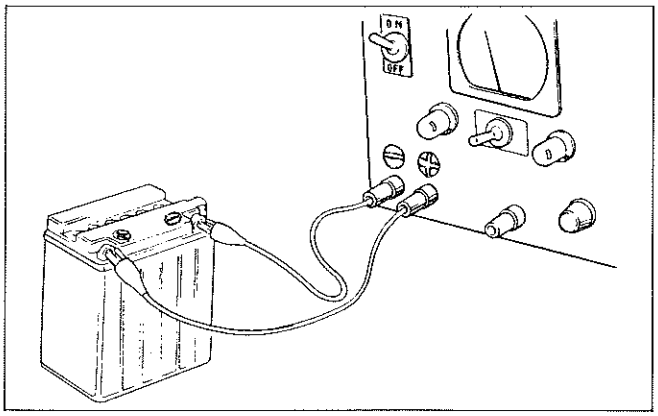
Set the mater to the DCV-Scale. Connect the Red lead to the battery (+) terminal and the Black lead to the (−) terminal.

Fully Charged: 12—13 volts
Normal Reading: 12—13 volts
Needs Charging: Below 11 volts



CHARGING

Remove the battery cell caps. Fill the cells with distilled water to the upper level line, if necessary.
Connect the charger positive (+) cable to the battery positive (+) terminal.
Connect the charger negative (−) cable to the battery negative (−) terminal.



Charging current: 1.4 amperes max.

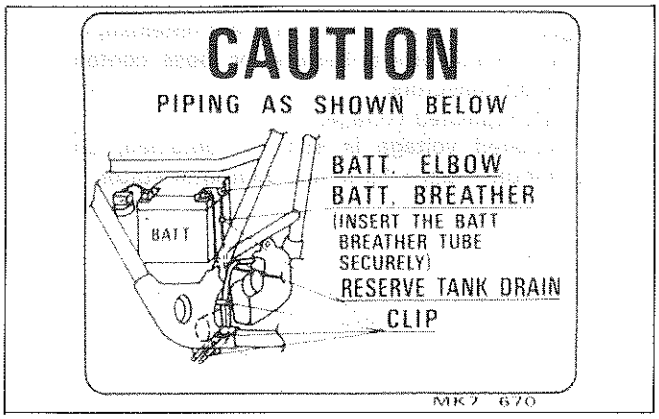
Charge the battery until specific gravity is 1.270—1.290 at 20°C (68°F).

WARNING

- ***Before charging a battery, remove the cap from each cell.***
- ***Keep flames and sparks away from a charging battery.***
- ***Turn power ON/OFF at the charger, not at the battery terminals, to prevent sparks.***
- ***Discontinue charging if the electrolyte temperature exceeds 45°C (113°F).***

CAUTION

- *Quick-charging should only be done in an emergency; slow-charging is preferred.*
- *Route the breather tube as shown on the battery caution label.*

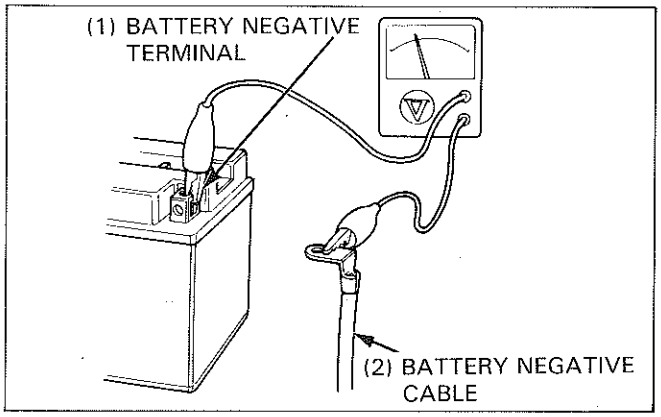


After installing the battery, coat the terminals with clean grease.

CHARGING SYSTEM

LEAKAGE INSPECTION

Check for battery for voltage leakage before making an charging output inspection.
Turn the ignition switch OFF. Remove the negative cable from the battery.
Connect the voltmeter between the negative cable and battery negative (−) terminal.
The voltmeter should indicate OV with the ignition switch OFF.

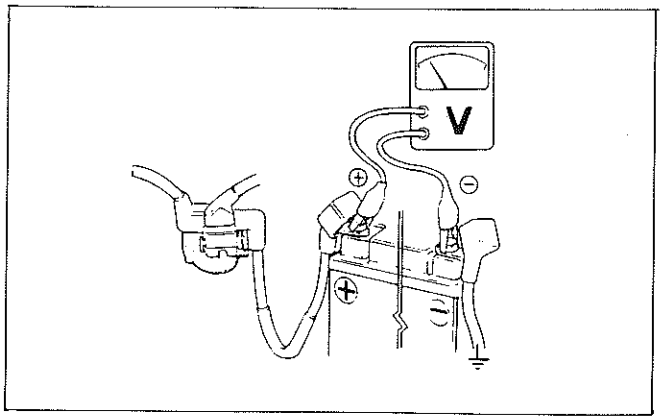


CHARGING OUTPUT INSPECTION

NOTE

- Use a fully charged 12 V battery (electrolyte specific gravity above 1.260 and battery voltage above 14—15 V) to test the charging output. Use of a weak battery will result in false readings.

Start the engine and warm it up to operating temprature.
Remove the right side cover.
Connect a voltmeter between the positive (+) and negative (−) terminals of the battery.



CAUTION

- *Be careful not to let the battery positive cable contact the frame while testing.*

Start the engine.
Gradually increase the engine speed and check that the voltage is regulated.

REGULATED VOLTAGE: 13—16 V at the 5,000 rpm

If the regulated voltage (13—16 V) is not obtained, check the wire harness (alternator-to-battery) or loose contact of the couplers and connectors.
Recheck the regulated voltage.
If the regulated voltage is still not obtained, check the regulater/rectifier (page 18-5) and alternator stator.

ALTERNATOR

STATOR INSPECTION

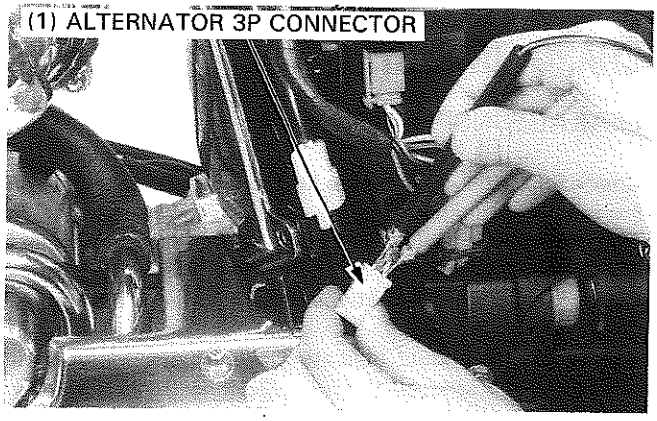
Remove the right side cover and remove the fuel pump stay.

Disconnect the alternator 3P connector.

Measure the resistance between the connector terminals and check for continuity between the each terminal and ground.

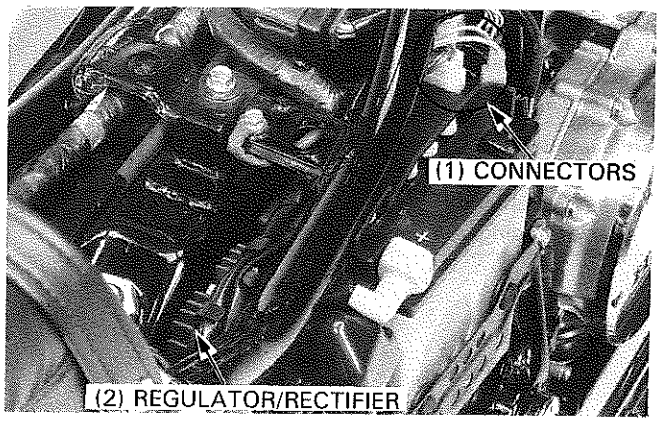
STANDARD: 0.3—0.5 Ω (20°C/68°F)

Replace the stator if the resistance is out of specification or if there is continuity between the connectors and ground.



VOLTAGE REGULATOR/RECTIFIER

Remove the left side cover.
Remove the battery (page 18-2).
Disconnect the pulse generator 4P, brake and taillight sensor 9P; '86 only:, rear brakelight switch 2P, and voltage regulator/rectifier 6P connectors.
Remove the starter motor cable and main fuse connector from the starter relay switch.
Remove the battery case them remove the voltage regulator/rectifier.
Check the continuity between the leads with an ohmmerter.



NOTE

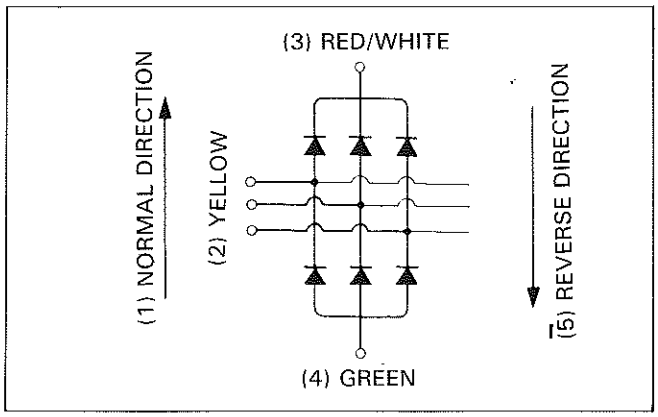
- The test results shown are for a positive ground ohmmeter and opposite results will be obtained when a negative ground ohmmeter is used.

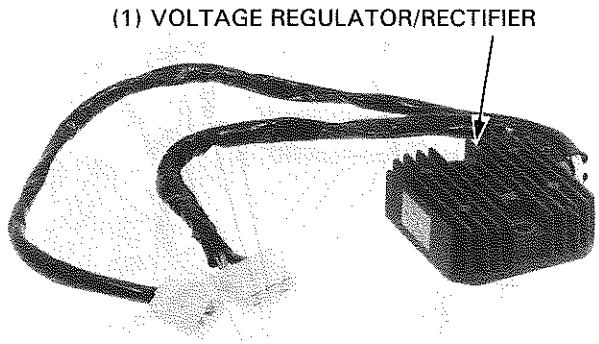
NORMAL DIRECTION: CONTINUITY

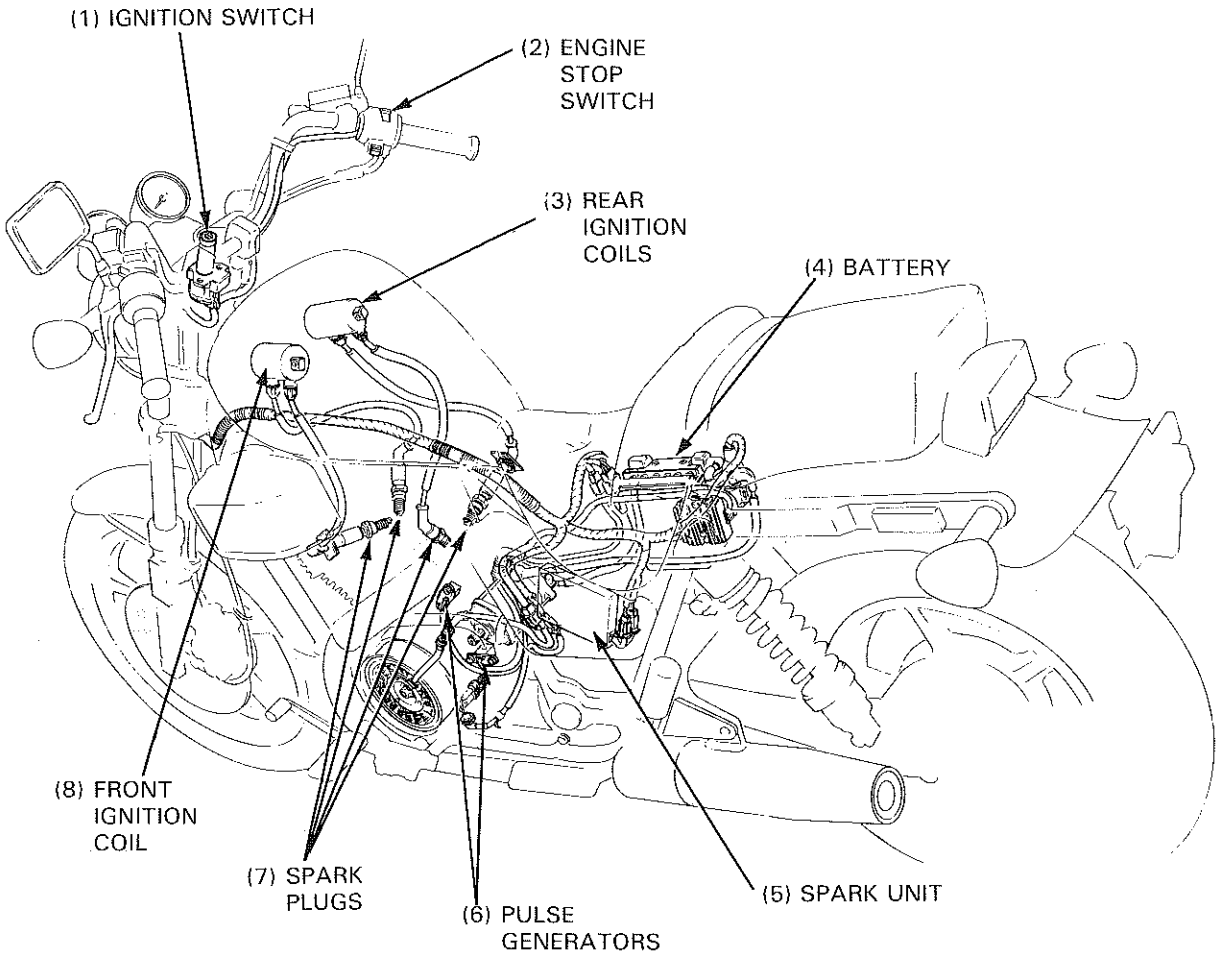
	⊕ probe	⊖ probe
I	YELLOW	GREEN
II	RED/WHITE	YELLOW

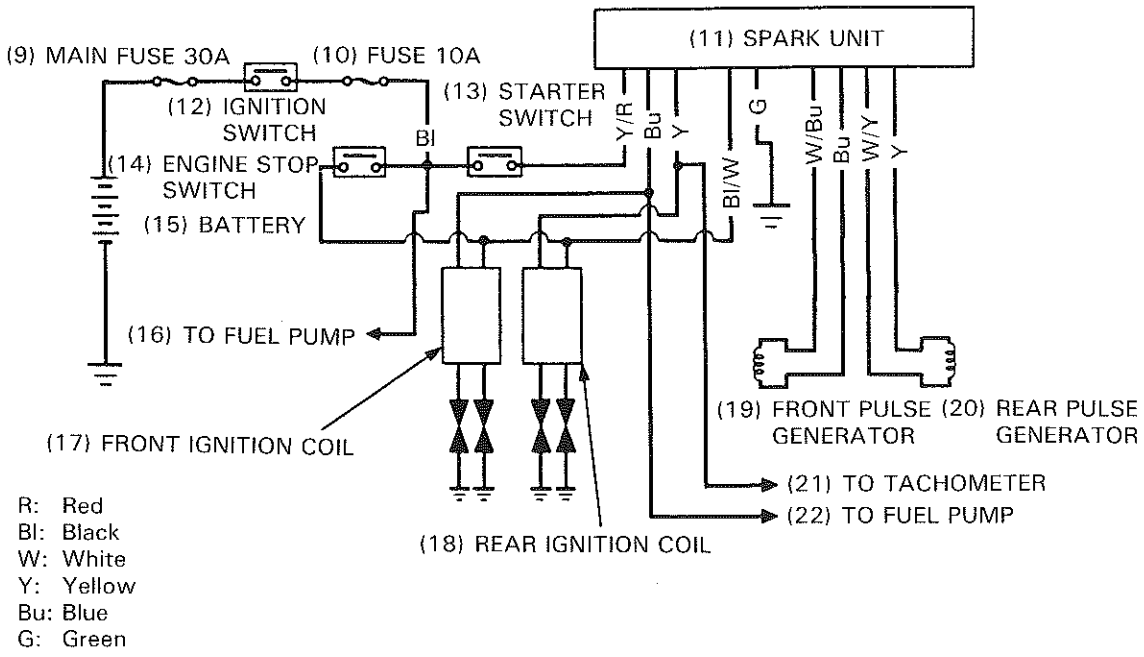
REVERSE DIRECTION: NO CONTINUITY

	⊕ probe	⊖ probe
I	GREEN	YELLOW
II	YELLOW	RED/WHITE









R: Red
Bl: Black
W: White
Y: Yellow
Bu: Blue
G: Green

SERVICE INFORMATION

GENERAL

- A transistorized ignition system is used and it cannot be adjusted.

SPECIFICATIONS

Spark plug	Brand		NGK	ND
	Standard		DPR7EA-9	X22EPR-U9
	For cold climate below 5°C (41°F)		DPR6EA-9	X20EPR-U9
	For extended high speed riding		DPR8EA-9	X24EPR-U9
	Gap		0.8—0.9 mm (0.031—0.035 in)	
Ignition coil resistance	Primary coil		2.0—2.2 Ω (20°C/68°F)	
	Secondary coil	without the spark plug cap	27—37 kΩ (20°C/68°F)	
		with the spark plug cap	19—25 kΩ (20°C/68°F)	
Crank pulse generator	Resistance		450—550 Ω (20°C/68°F)	
	Air gap		0.30—0.70 mm (0.012—0.028 in)	

TROUBLESHOOTING

Engine cranks but will not start
- Engine stop switch OFF
- No spark at plugs
- Faulty transistorized spark unit
- Faulty pulse generator

No spark at plug
- Engine stop switch OFF
- Poorly connected, broken or shorted wires
  - Between ignition switch and engine stop switch
  - Between spark unit and engine stop switch
  - Between spark unit and ignition coil
  - Between ignition coil and plug
  - Between spark unit and pulse generator
- Faulty ignition coil
- Faulty ignition switch
- Faulty spark unit
- Faulty pulse generator

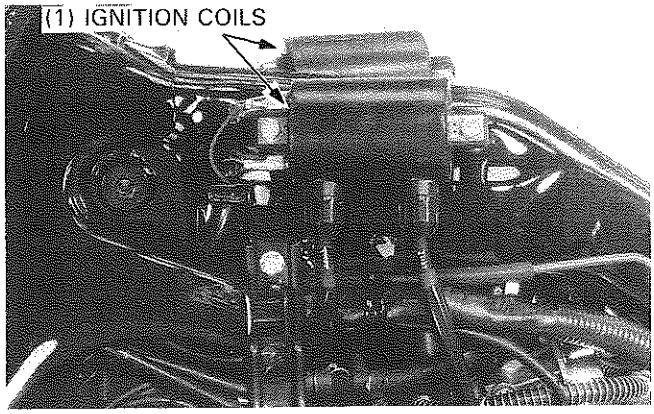
Engine starts but runs poorly
- Ignition primary circuit
  - Faulty ignition coil
  - Loose or bare wire
  - Intermittent short circuit
- Secondary circuit
  - Faulty plug
  - Faulty spark plug wire

Timing advance incorrect
- Faulty spark unit

IGNITION COIL

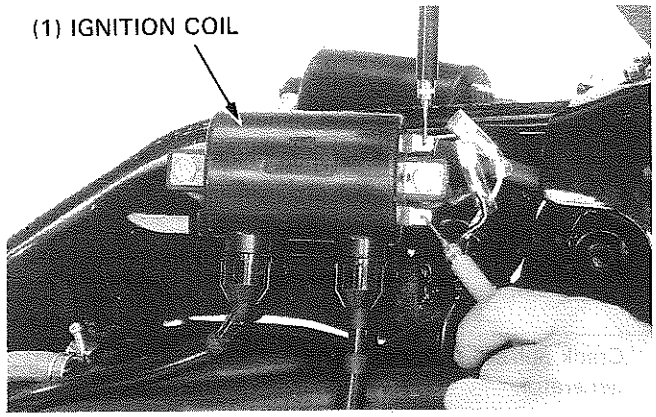
REMOVAL

Remove the seats and fuel tank.
Disconnect the ignition coil wires and remove the spark plug cap from the spark plug.
Remove the ignition coil by removing the two attaching bolts.



CIRCUIT CHECK

Disconnect the Black/White wire from the ignition coil and measure the voltage between the Black/White and ground.
There should be battery voltage with the ignition and engine stop switches at ON.
Check the Black/White wires of the harness if battery voltage is not available.



CONTINUITY CHECK

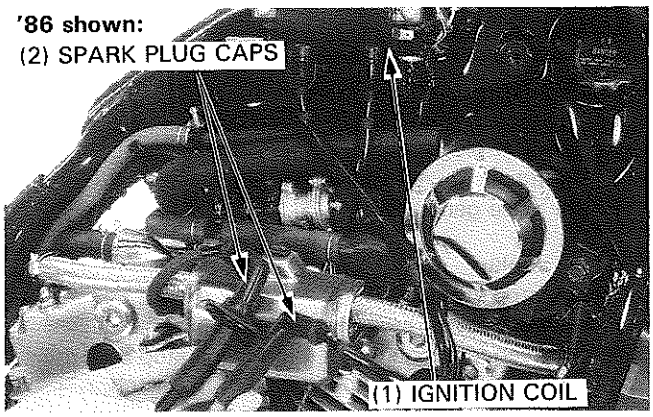
Measure the ignition coil primary coil resistance.

STANDARD: 2.0—2.2 Ω (20°C/68°F)

Disconnect the spark plug caps from the spark plug and measure the resistance between the spark plug caps.

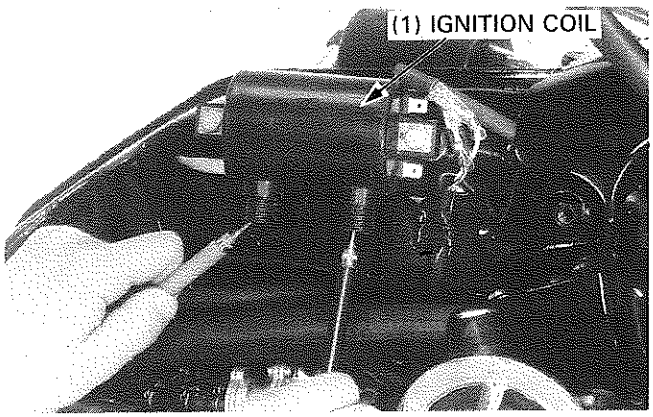
STANDARD: 27—37 kΩ (20°C/68°F)

If the measurement is out of specification, check the secondary coil resistance without spark plug wires, to confirm whether the coil or the plug cap resistance is cause.



Remove the spark plug wires and measure the resistance of secondary coil.

STANDARD: 19—25 kΩ (20°C/68°F)



TRANSISTORIZED IGNITION SYSTEM (Pulse Generator, Spark Unit)

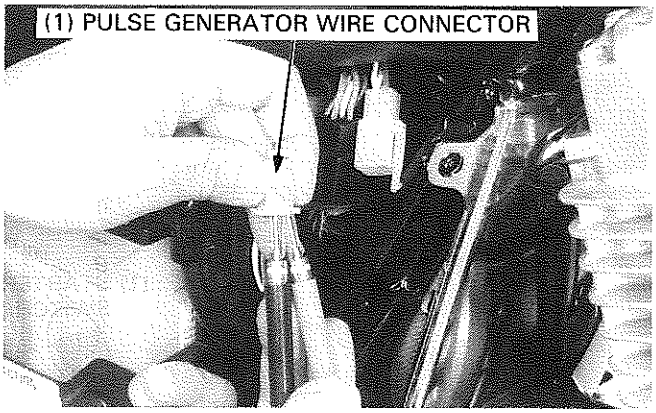
PULSE GENERATOR

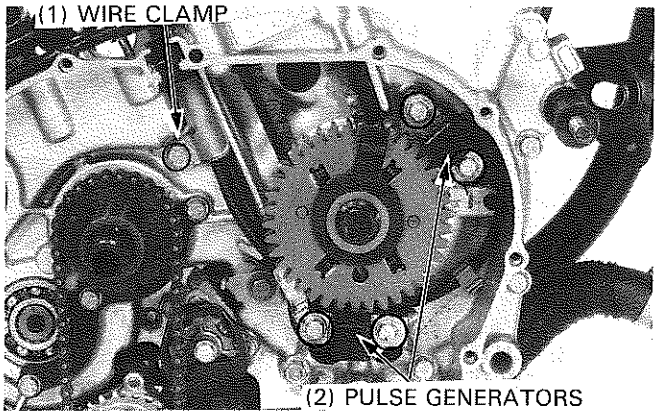
Continuity test
Remove the left side cover.
Disconnect the pulse generator 4P white connector.
Measure the resistance between the each wire terminals of the pulse generator 4P white connector at the wire harness side.

STANDARD: 450—550 Ω (20°C/68°F)

FRONT PULSE GENERATOR: WHITE/BLUE AND BLUE WIRE TERMINALS
REAR PULSE GENERATOR: WHITE/YELLOW AND YELLOW WIRE TERMINALS

— If standard resistance (450—550 Ω) is not obtained;
Remove the right side cover.
Disconnect the pulse generator connector, measure the front and rear pulse generators resistance.
If there is standard resistance (450—550 Ω), check the loose contact of the connector, open or short circuit in the wire harness.





Replacement
Remove the right crankcase cover and clutch (section 7).

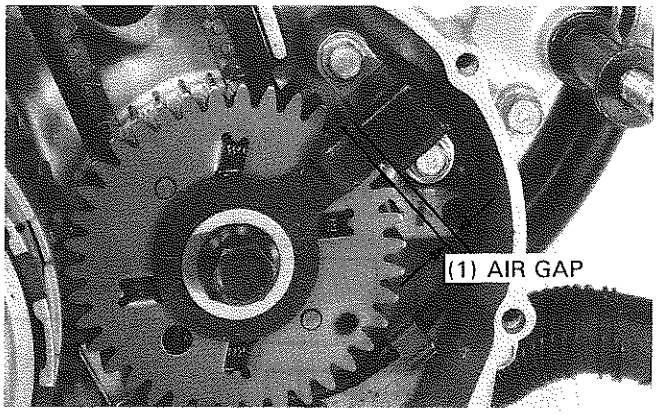
Remove the pulse generator attaching bolts, wire clamps and the pulse generators.

Install new pulse generator, making sure the dowel pins are in place and wire clamps are attached as shown.

Install the clutch (section 7).

Turn the crankshaft clockwise and align the pulse generator rotor tip with the pulse generator magnet.
Measure the air gap with a feeler gauge.

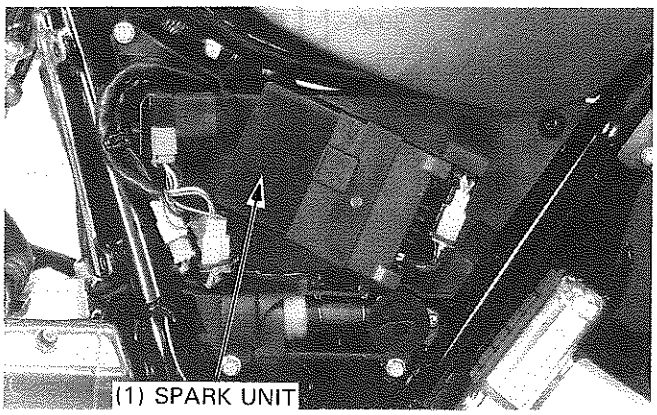
AIR GAP: 0.3—0.7 mm (0.012—0.028 in)

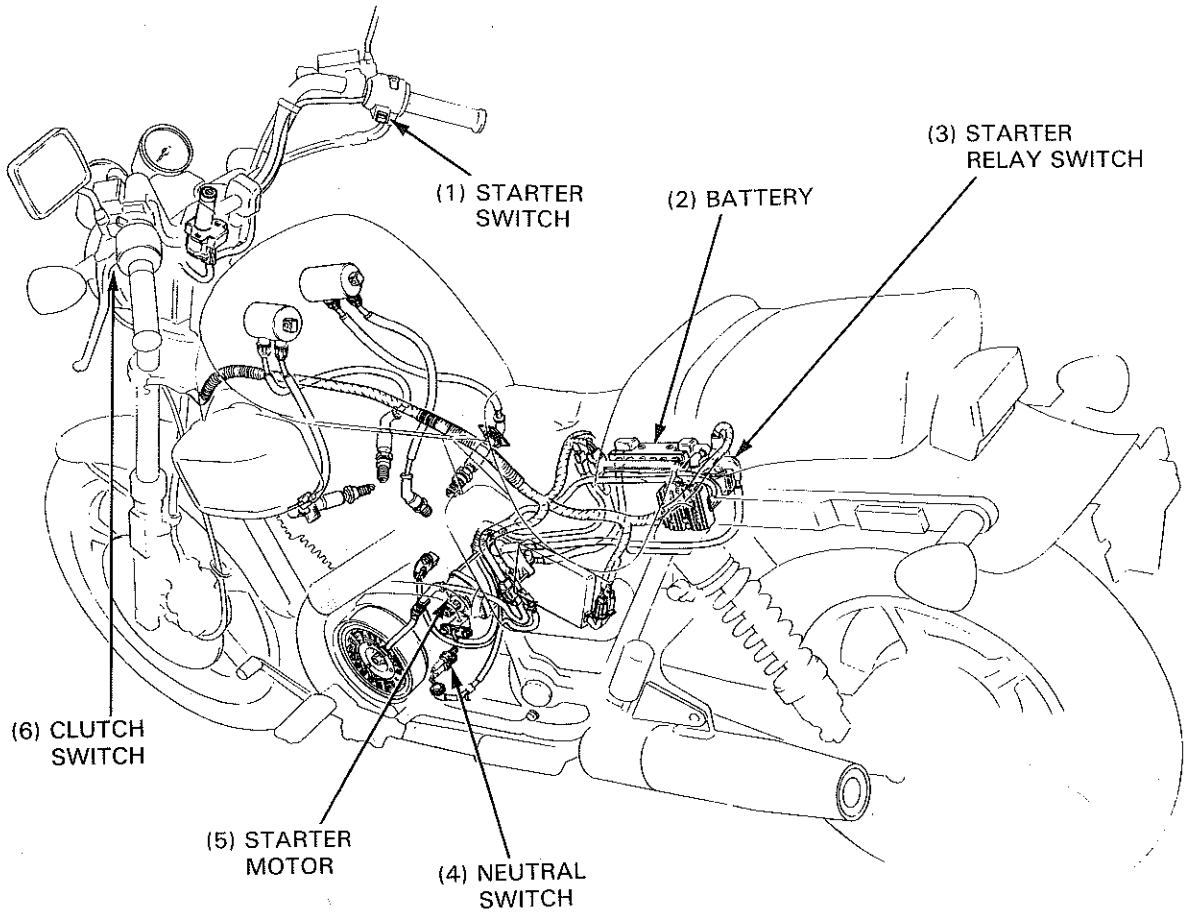


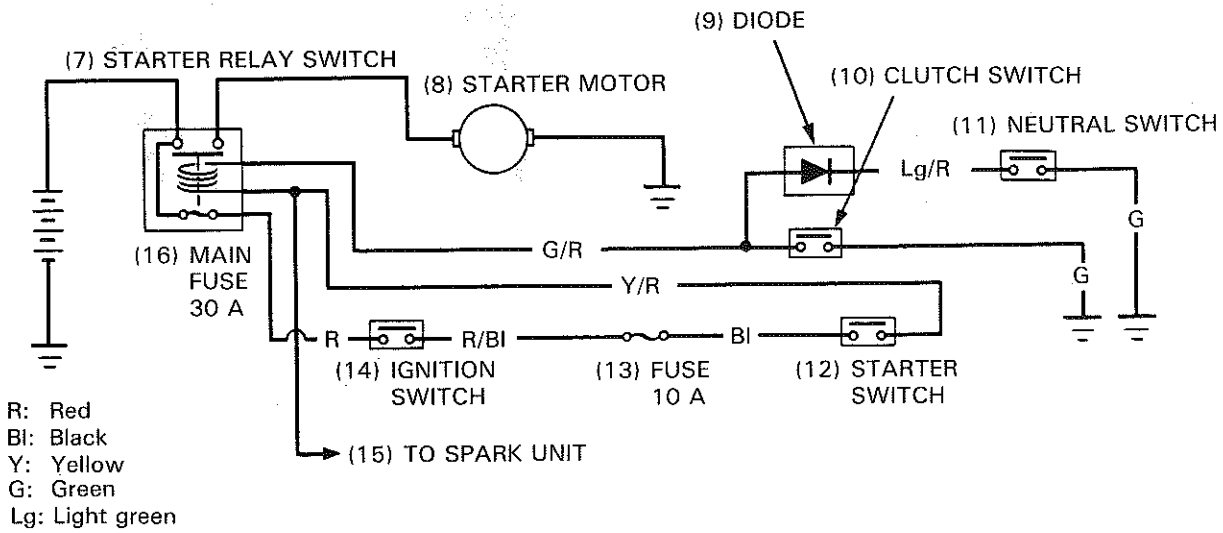
Install the right crankcase cover (section 7).

SPARK UNIT

Remove the left side cover.
Disconnect the spark unit 6P black connector.
Measure the voltage between the black/white and green terminals of the spark unit 6P connector.
When the ignition and engine stop switch are "ON", there should be battery voltage.
Check the continunity between the yellow/red wire (spark unit 6P connector-to-starter relay switch connector).
If the pulse generators, ignition coils, wiring and connector are good, and the ignition timing is not within specification; replace the spark unit with new one and recheck the ignition timing.




(1) STARTER SWITCH
(2) BATTERY
(3) STARTER RELAY SWITCH
(4) NEUTRAL SWITCH
(5) STARTER MOTOR
(6) CLUTCH SWITCH


(7) STARTER RELAY SWITCH
(8) STARTER MOTOR
(9) DIODE
(10) CLUTCH SWITCH
(11) NEUTRAL SWITCH
(12) STARTER SWITCH
(13) FUSE 10 A
(14) IGNITION SWITCH
(15) TO SPARK UNIT
(16) MAIN FUSE 30 A
Lg/R
G
G/R
Y/R
R
R/Bl
Bl
R: Red
Bl: Black
Y: Yellow
G: Green
Lg: Light green

20.ELECTRIC STARTER

SERVICE INFORMATION

GENERAL

● The starter motor can be removed with the engine in the frame.

SPECIFICATIONS

ITEM		STANDARD	SERVICE LIMIT
Starter motor	Brush spring tension	680—920 g (24.0—32.5 oz)	545 g (19.2 oz)
	Brush length	12.0—13.0 mm (0.47—0.51 in)	6.5 mm (0.26 in)

TROUBLESHOOTING

Starter motor will not turn
- Battery discharged
- Faulty ignition switch
- Faulty starter switch
- Faulty neutral switch
- Faulty starter relay switch
- Loose or disconnected wire or cable
- Clutch diode open

Starter motor turns engine slowly
- Low battery specific gravity
- Excessive resistance in circuit
- Binding in starter motor

Starter motor turns, but engine does not turn
- Faulty starter clutch
- Faulty starter motor gears
- Faulty starter motor or idle gear

Starter motor and engine turns, but engine does not start
- Faulty ignition system
- Engine problems
  - — Low compression
  - — Fouled spark plugs

STARTER MOTOR

REMOVAL

WARNING

- ***With the ignition switch OFF, remove the negative cable at the battery before servicing the starter motor.***

Drain the radiator coolant (page 6-3).
Remove the water hose from the rear cylinder.

Remove the starter drive gear (page 8-2).

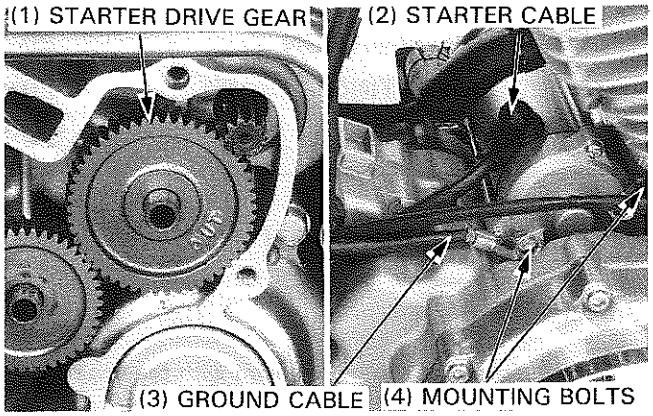
Remove the starter motor cable from the motor.

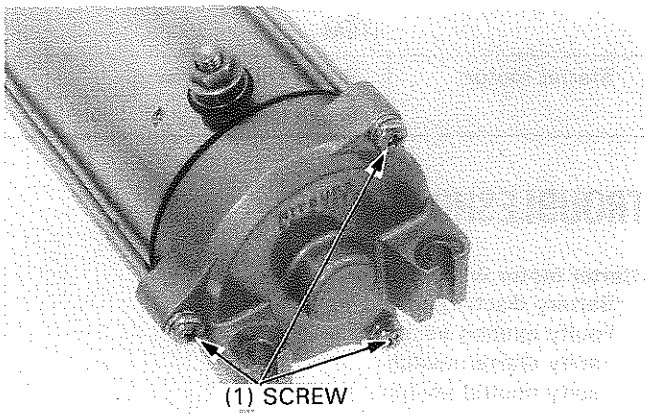
Remove the starter motor mounting bolts and the motor.

Remove the three screws and rear motor cover.
Remove the armature from the starter motor.

NOTE

- Note the location and number of thrust washers.





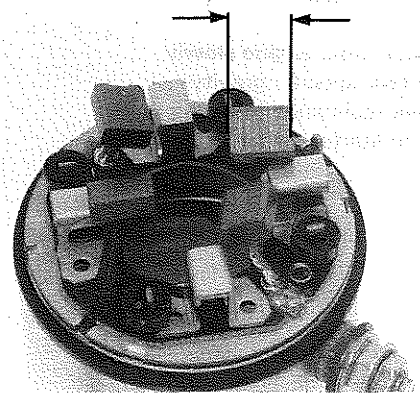
INSPECTION

Measure the brush length.

SERVICE LIMIT:6.5 mm (0.26 in)

Measure the brush spring tension with a spring scale.

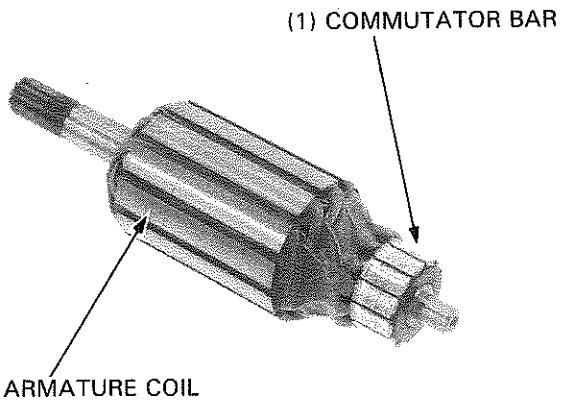
SERVICE LIMIT:545 g (19.2 oz)



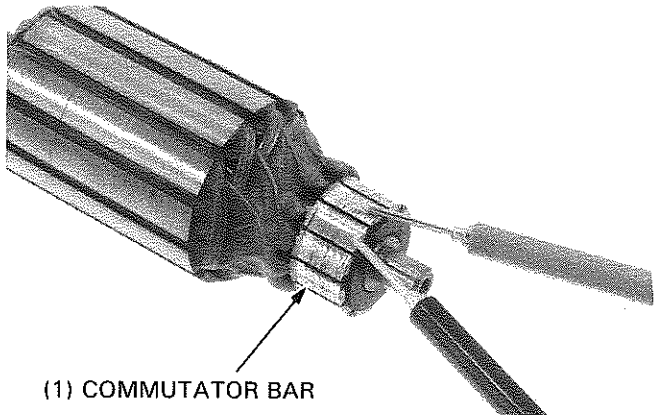
Inspect the commutator bars for discoloration. Bars discolored in pairs indicate grounded armature coils.

NOTE

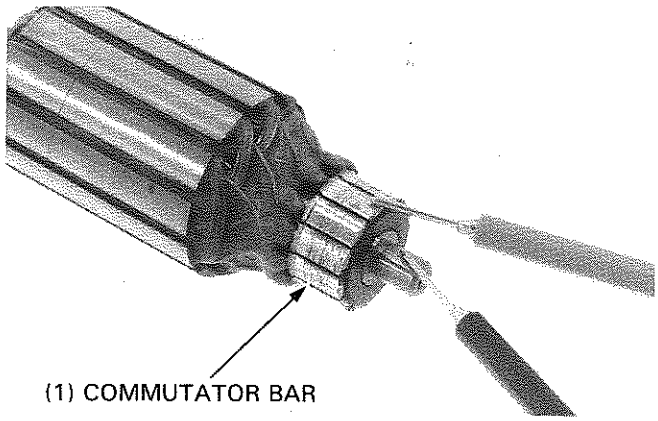
- Do not use emery or sand paper on the commutator.



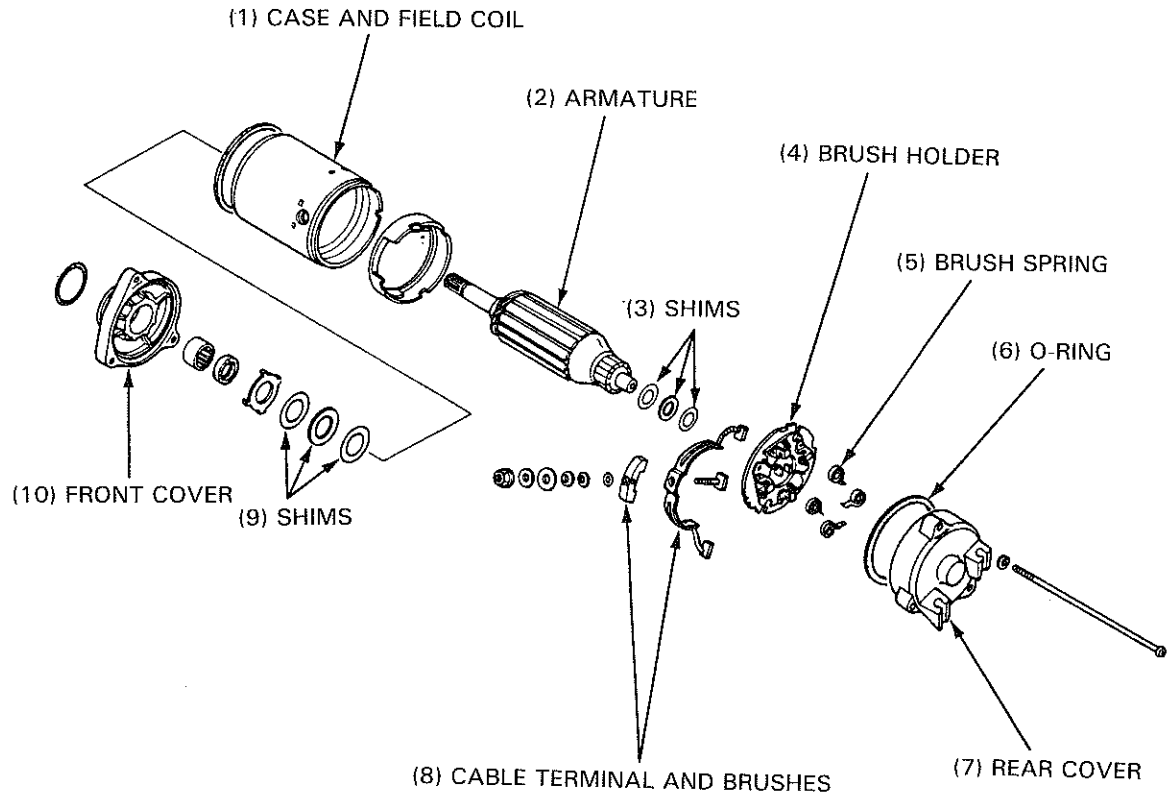
Check for continuity between pairs of commutator bars.
There should be continuity.



Check for continuity between each individual commutator bar and the armature shaft.
There should be no continuity.



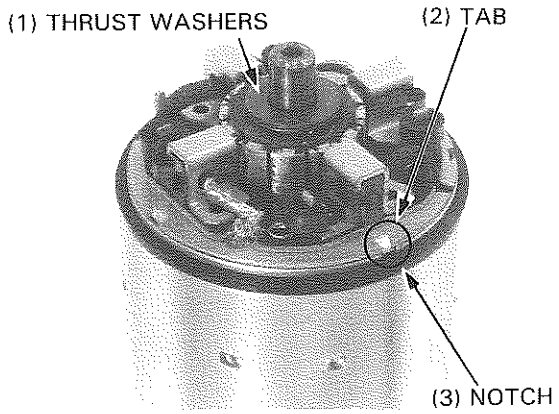
ASSEMBLY/INSTALLATION



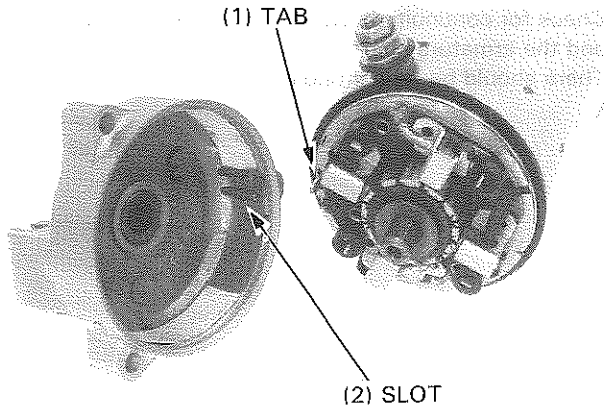
Assemble the starter motor.
Align the starter motor case notch with the brush holder tab.

NOTE

- Do not forget to install the thrust washers.



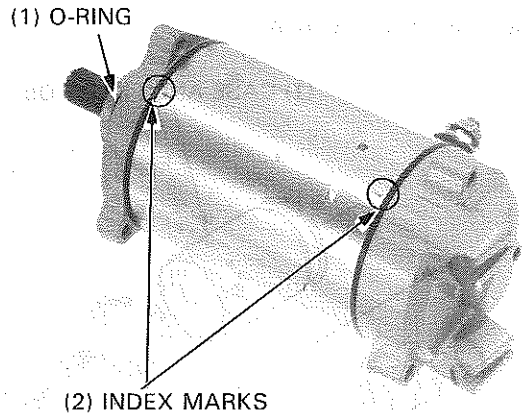
Install the rear cover, aligning its slot with the brush holder tab.



Align the index marks on the front cover, case and rear cover, then tighten the starter motor case screws.

Install the starter motor in the reverse order of removal.

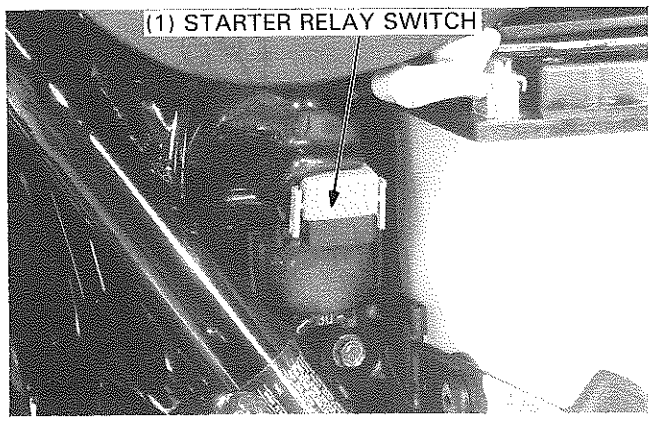
Install the water hose to the rear cylinder.
Fill and bleed the cooling system (page 6-3).



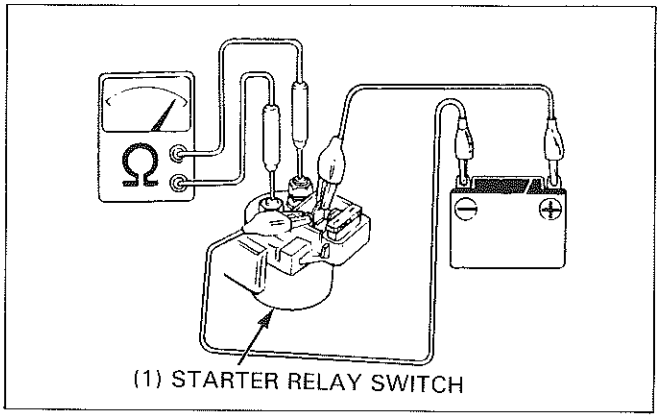
STARTER RELAY SWITCH

INSPECTION

Shift the transmission into the neutral.
Disconnect the connector from the starter relay.
Measure the voltage between the yellow/red and green/red wire terminals of the connector at the harness side.
Turn the ignition switch "ON".
There should be battery voltage while the starter switch is depressed.
If the there is no voltage, check the loose contact of the neutral switch, sub fuse and connector, or open circuit in the wire harness.



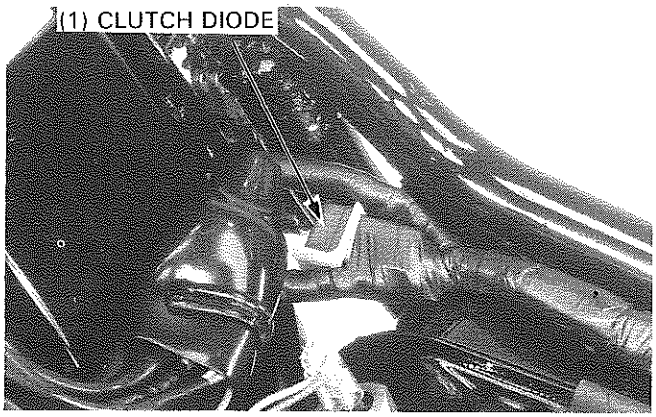
Connect an ohmmeter to the starter relay switch terminals. Connect a 12 V battery to the switch connector terminals with the positive wire to the yellow/red wire terminal and the negative wire to the green/red wire terminal. The switch is normal if there is continuity.



CLUTCH DIODE

REMOVAL

Remove the main seat.
Remove the clutch diode from the wire harness.



INSPECTION

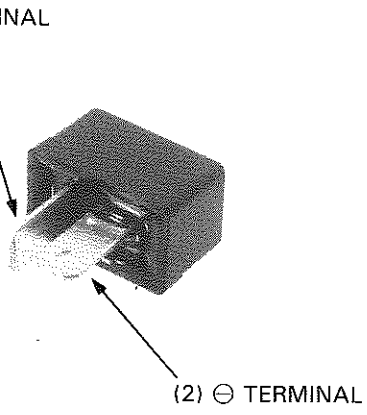
Check for continuity with an ohmmeter.

Connect the positive probe to the ⊕ terminal and the negative probe to the ⊖ terminal of the diode.

There should be continuity, then with the probe reversed, there should be no continuity.

NOTE

- The test results shown are for a positive ground ohmmeter and the opposite results will be obtained when a negative ground ohmmeter is used.



SERVICE INFORMATION

GENERAL

- Some wires have different colored bands around them near the connector. These are connected to other wires which have the same color band.
- All plastic connectors, have locking tabs that must be released before disconnecting, and must be aligned when reconnecting.
- The following color codes used are indicated throughout this section and on the wiring diagram.

Bu = Blue	**G = Green**	**Lg = Light Green**	**R = Red**
Bl = Black	**Gr = Grey**	**O = Orange**	**W = White**
Br = Brown	**Lb = Light Blue**	**P = Pink**	**Y = Yellow**

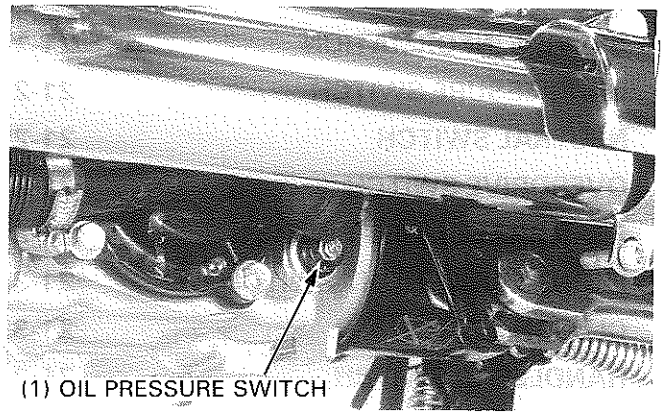
- To isolate an electrical failure, check the continuity of the electrical path through the part. A continuity check can usually be made without removing the part from the motorcycle. Simply disconnect the wires and connect a continuity tester or volt-ohmmeter to the terminals or connections.
- A continuity tester is useful when checking to find out whether or not there is an electrical connection between the two points. An ohmmeter is needed to measure the resistance of a circuit, such as when there is a specific coil resistance involved, or when checking for high resistance caused by corroded connections.

OIL PRESSURE SWITCH

Remove the oil pressure switch.

Check for continuity between the terminal and switch body.

The switch should show continuity with no pressure and up to 0.1—0.2 kg/cm² (1.4—2.8 psi). There should be no continuity at pressures above this.



NEUTRAL SWITCH

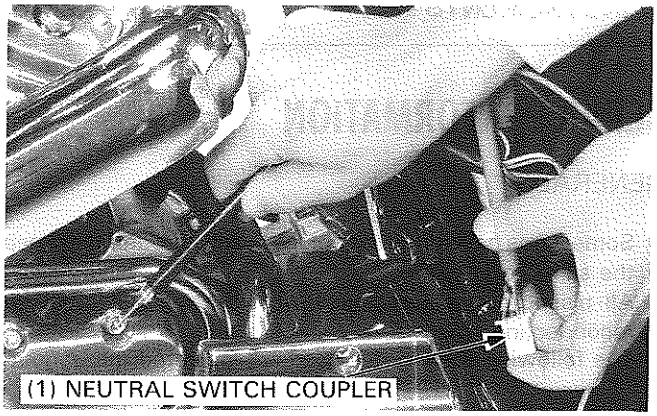
Remove the left side cover and disconnect the neutral switch coupler.

Place the transmission in neutral and check for continuity between the Light green/Red wire and ground.

There should continuity when the transmission is in neutral and no continuity in any other position.

REPLACEMENT

Remove the left crankcase cover (page 8-2) and remove the neutral switch.

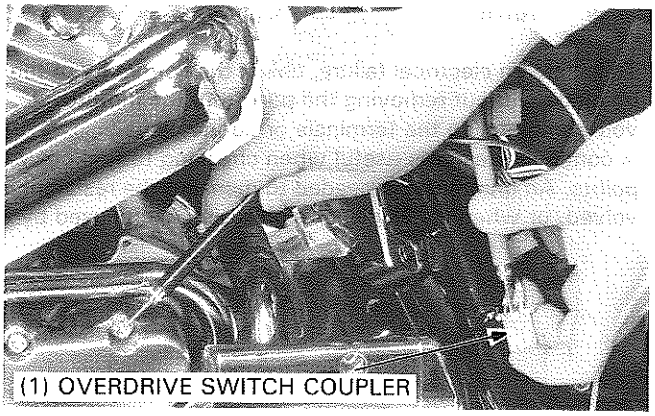


OVERDRIVE SWITCH

Remove the left side cover and disconnect the overdrive switch coupler.
Place the transmission in overdrive and check for continuity between the Green/Orange wire and ground.

There should continuity when the transmission is in overdrive and no continuity in other position.

Remove the left crankcase cover (page 8-2) and replace the overdrive switch.

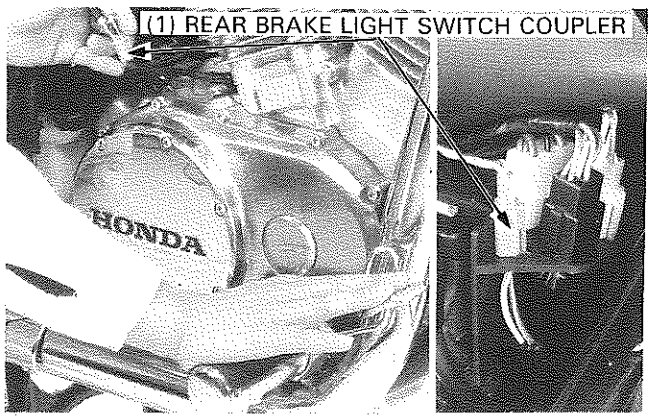


REAR BRAKE LIGHT SWITCH

Disconnect the rear brake light switch coupler and check for continuity.

The switch should continuity with the rear brake applied and no continuity with free.

Replace the rear brake light switch if necessary.

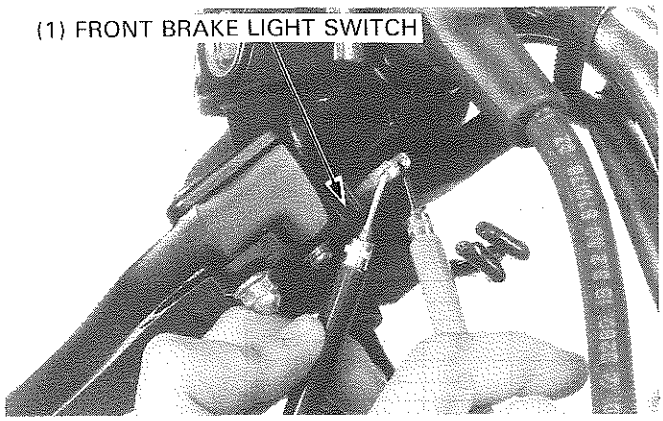


FRONT BRAKE LIGHT SWITCH

Disconnect the front brake light switch connectors and check for continuity.

The switch should continuity with the front brake applied.

Replace the switch if necessary.

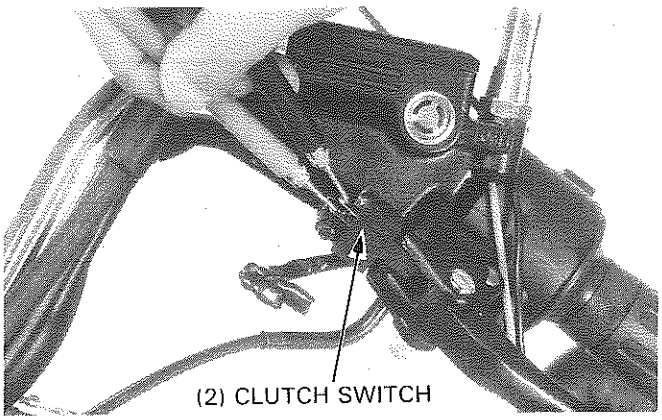


CLUTCH SWITCH

Disconnect the clutch (safety) switch connectors and check for continuity.

The switch should have continuity with the clutch lever applied.

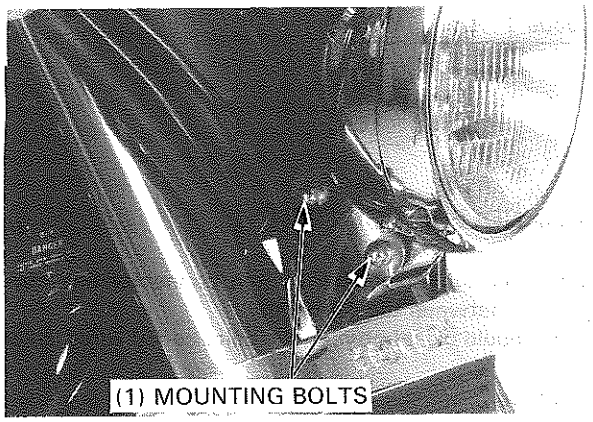
Replace the clutch (safety) switch if necessary.



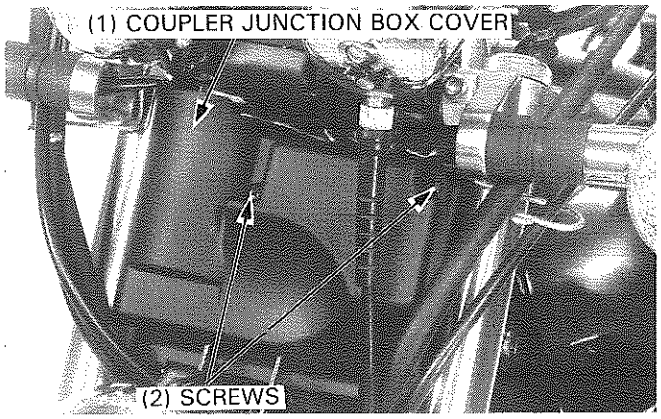
HANDLEBAR SWITCH

The handlebar switch (dimmer, turn signals, horn, starter, engine stop, etc.) must be replaced as an assembly.

Remove the headlight upper mounting bolt and loosen the lower mounting bolt.



Lower the headlight and remove the coupler junction cover.



LEFT HANDLEBAR SWITCH

Disconnect the left handlebar switch connector and check for continuity between the terminals.
Continuity should exist between the color coded wires in each chart.

Dimmer Switch

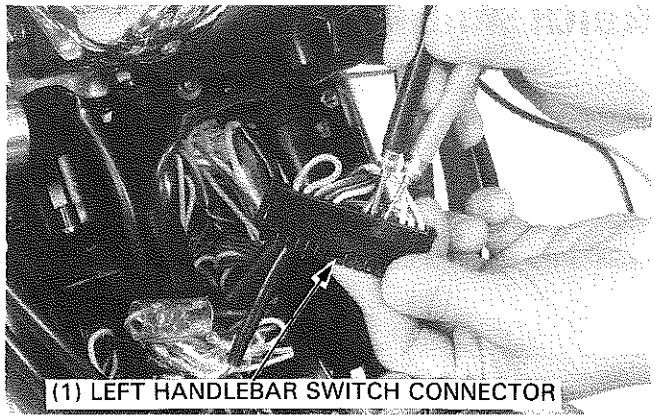
	HL	Hi	Lo
Hi	O——	——O	
(N)	O——	——O	——O
Lo	O——		——O
Color code	Bu/W	Bu	W

Turn Signal Switch

	W	L	R	P	PR	PL
LEFT	O——	——O		O——	——O	
OFF				O——	——O	——O
RIGHT	O——		——O	O——		——O
Color code	Gr	O	Lb	Br/W	Lb/W	O/W

Horn Button

	Ho_2	Ho_1
Depressed	O——	——O
Released		
Color code	Lg	W/G


(1) LEFT HANDLEBAR SWITCH CONNECTOR

RIGHT HANDLEBAR SWITCH

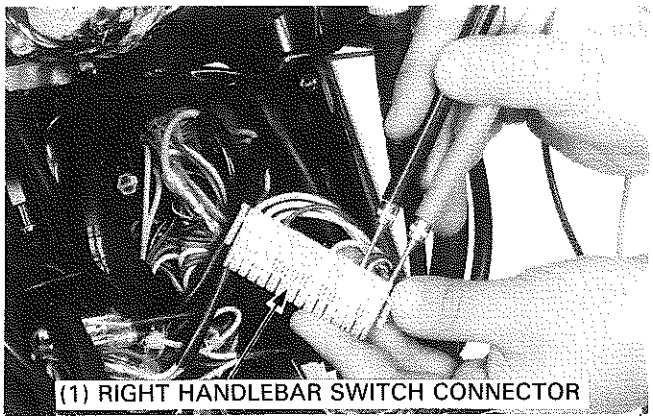
Disconnect the right handlebar switch connector and check for continuity between the terminals.
Continuity should exist between the color coded wires in each chart.

Starter Button

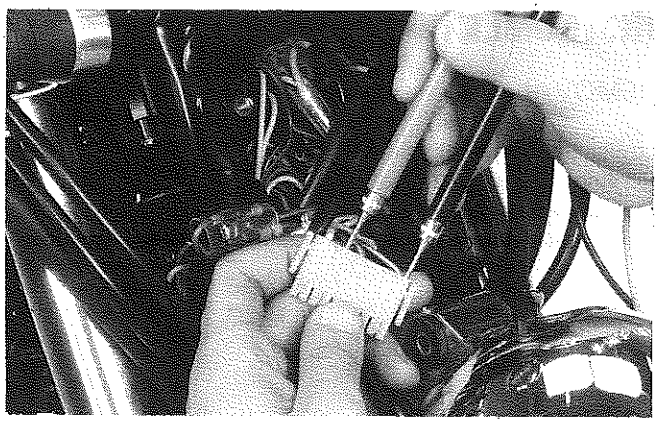
	BAT_2	ST	HL	BAT_5
Released			O——	——O
Depressed	O——	——O		
Color code	Bl	Y/R	Bu/W	Bl/R

Engine Stop Switch

	IG_1	BAT_2
OFF		
RUN	O——	——O
Color code	Bl/W	Bl


(1) RIGHT HANDLEBAR SWITCH CONNECTOR

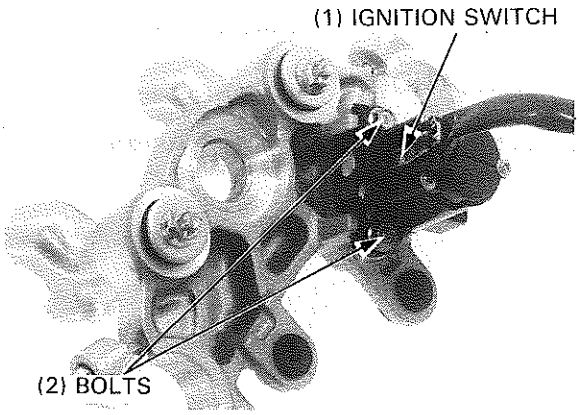
IGNITION SWITCH



INSPECTION

Remove the coupler junction cover (page 21-3) and disconnect the ignition switch wire couplers and connector.
Check for continuity between the terminals.
The continuity should exist between the terminals in each switch position.

	BAT	IG	FAN	TL_1	TL_2	P
ON	O	O	O	O	O	
OFF						
P	O					O
LOCK						
Color code	R	R/Bl	Bu/O	Br/W	Br	Y/Bl

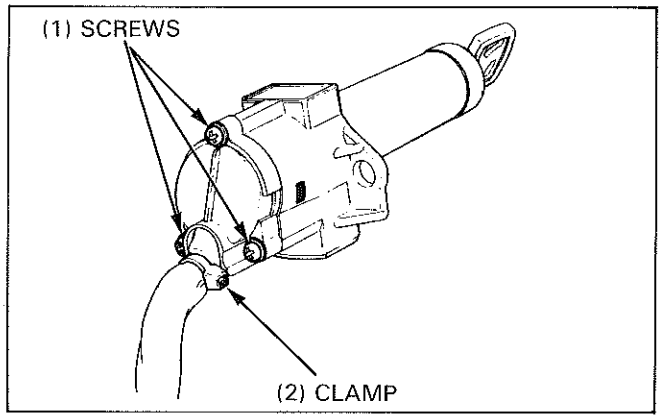


REMOVAL

Remove the fork top bridge (page 15-18).
Remove the two ignition coil mounting bolts and ignition switch from the bridge.

DISASSEMBLY/ASSEMBLY

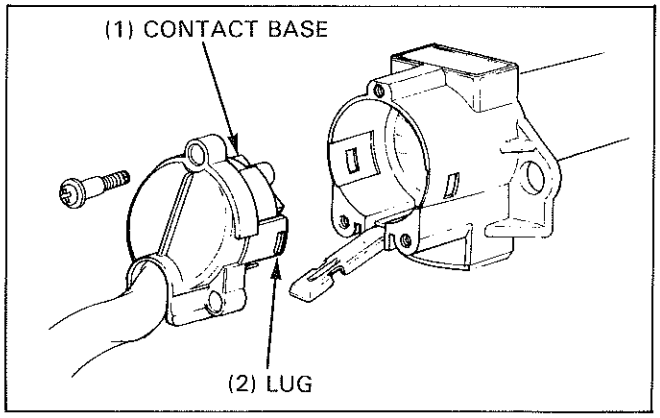
Remove the wire clamp and the three screws.



Insert the key into the ignition switch and position it between the ON and OFF positions.

Push in the lugs in the slots and pull out the contact base from the switch.

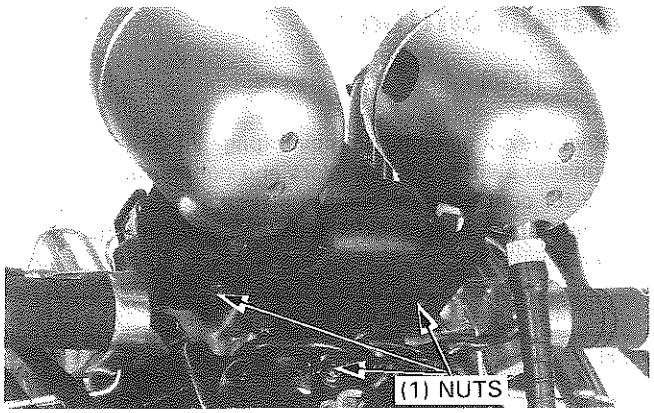
Assemble the ignition switch in the reverse order of disassembly.



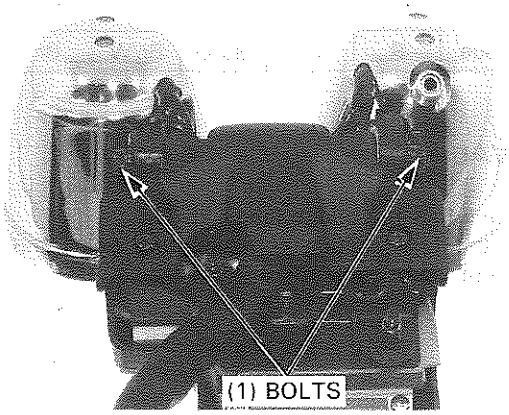
INSTRUMENTS

REMOVAL

Lower the headlight (page 21-3).
Remove the junction box cover and disconnect the instruments wire connectors.
Remove the three instruments mounting nuts and instruments.



Remove the two bolts and indicator panel.

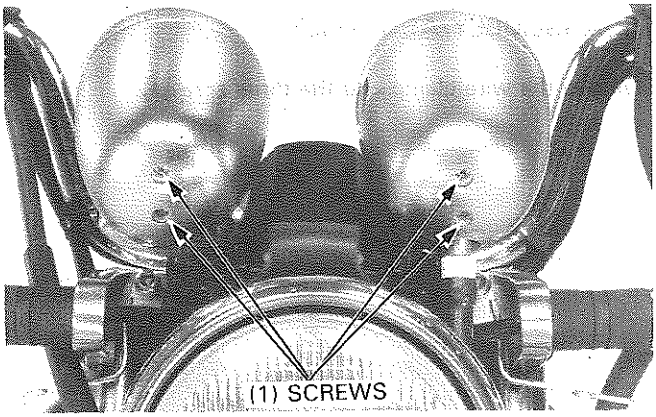


INSTALLATION

Install the instruments in the reverse order of removal.

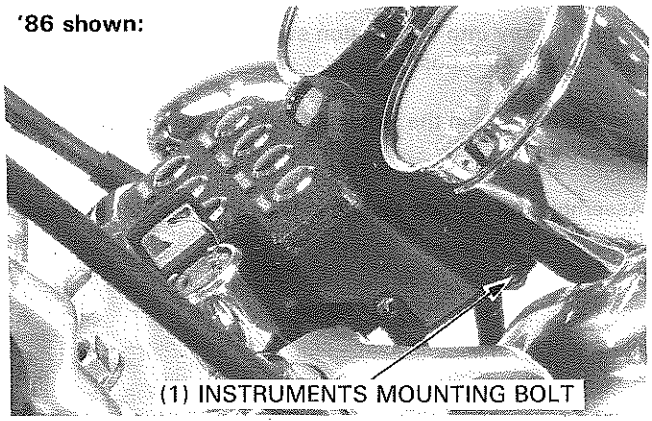
BULB REPLACEMENT

Remove the two screws behind the instruments.

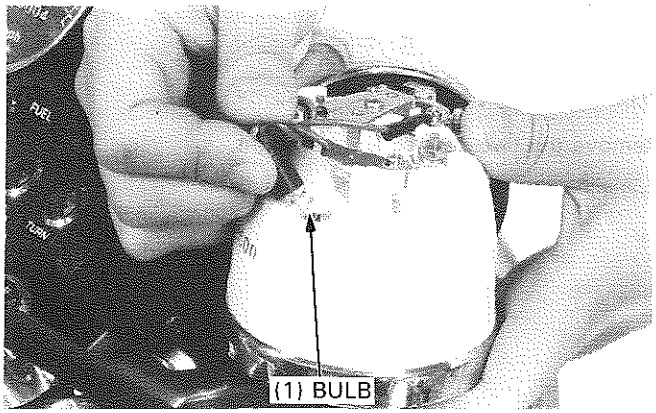


Remove the instruments mounting bolt and pull the instruments out from the rear cover.

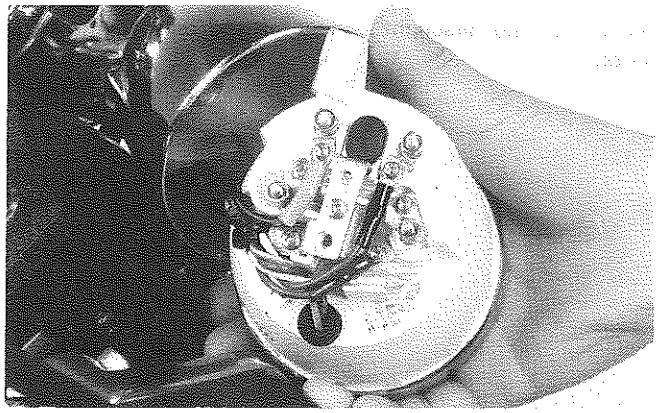
'86 shown:



Pull the bulb socket and replace the bulb with a new one.

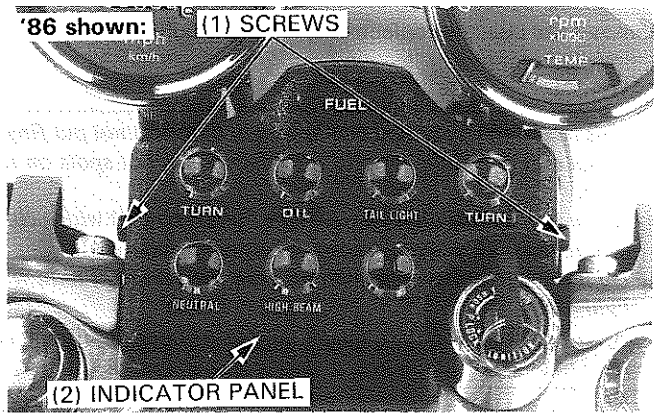


If the instrument wires have been disconnected, connect the wires to the correct position as shown.



INDICATOR PANEL BULB REPLACEMENT

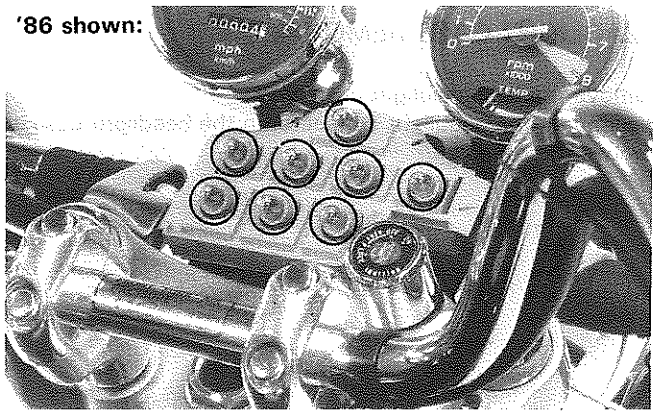
Remove the two screws attaching the indicator panel.



Pull the bulbs out and replace them with new ones.

NOTE

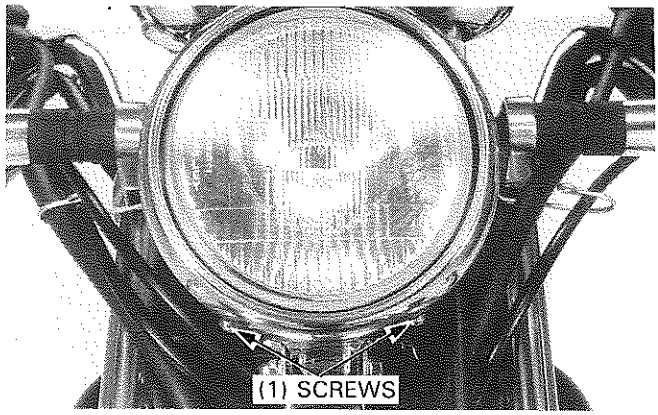
- After '86; not equipped brake/taillight warning system and circuit.



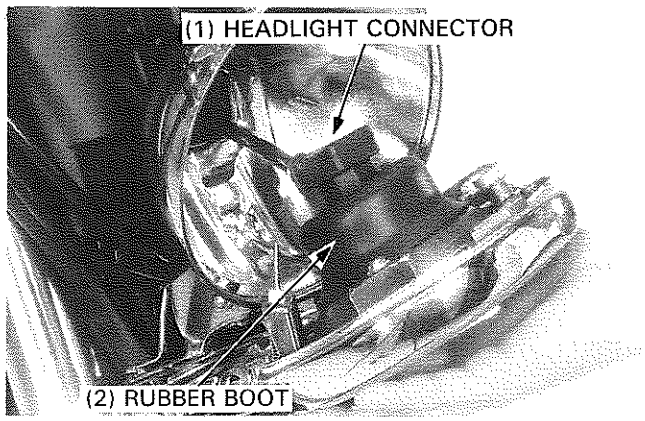
HEADLIGHT

BULB REPLACEMENT

Remove the two screws and headlight.



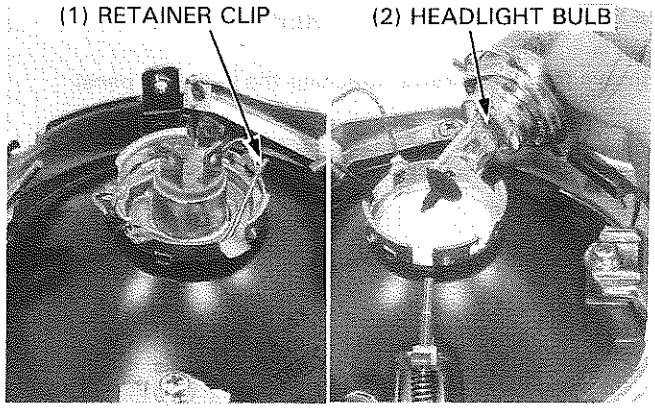
Disconnect the headlight connector and remove the rubber boots.



Remove the clip and replace the headlight bulb.

CAUTION

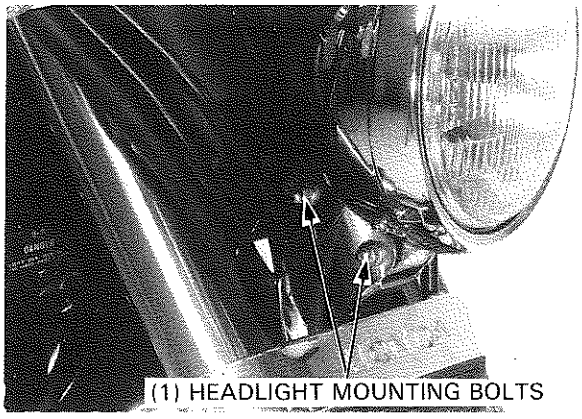
- *This model equipped halogen headlight bulb. Do not put finger prints on the headlight bulb, they may create hot spots on the bulb.*
- *If you touch the bulb with your bare hands, clean it with a cloth moistened with alcohol to prevent its early failure.*
- *Do not try to replace the bulb or clean the headlight until with light ON.*
- *After replacing the bulb, install the rubber boot tightly against the unit.*



Install the headlight in the reverse order of removal.

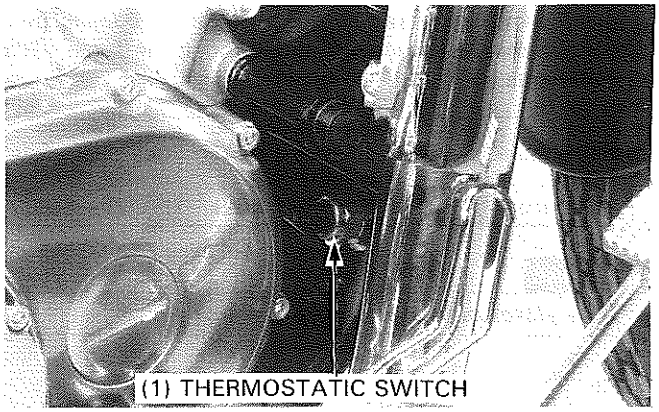
HEADLIGHT CASE REMOVAL

Remove the two headlight case bolts.
Disconnect the headlight connector in the headlight case and remove the case.

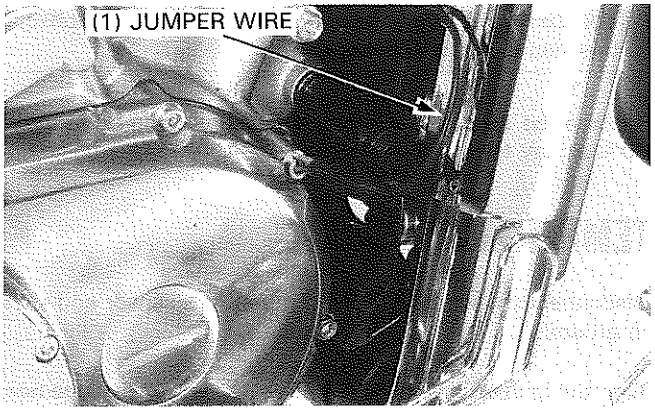


THERMOSTATIC SWITCH

The cooling fan motor is actuated by the thermostatic switch located in the bottom of the radiator.



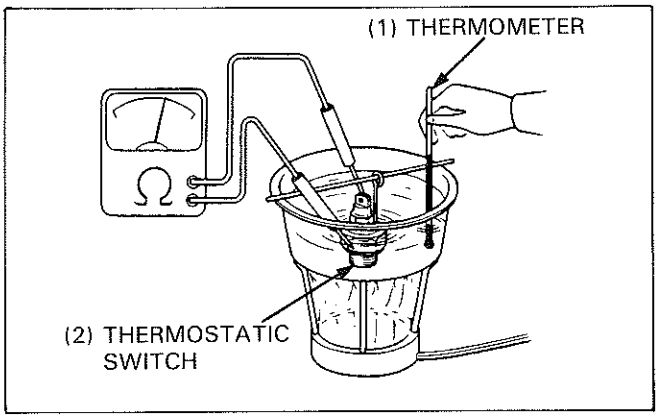
If the fan motor does not start, disconnect the Black/Blue lead from the thermostatic switch and ground it with a jumper wire as shown.
Turn the ignition switch ON. The cooling fan motor should start running. If it does not start, check for battery voltage from the Black/Blue lead of the fan motor coupler and ground with ignition switch ON.
If there is no voltage, check for a blown fuse, loose terminals or connectors, or an open circuit.



If there is voltage, inspect the thermostatic switch as follows:
Connect one lead of an ohmmeter to the connector of the thermostatic switch and the other to the body.

Suspend the thermostatic switch in a pan of coolant (50—50 mixture) and check the temperatures at which the switch opens and closes.

Make sure that there is no continuity at room temperature and then gradually raise the coolant temperature. The switch should show continuity (close) at 93°—97°C (199°—207°F).

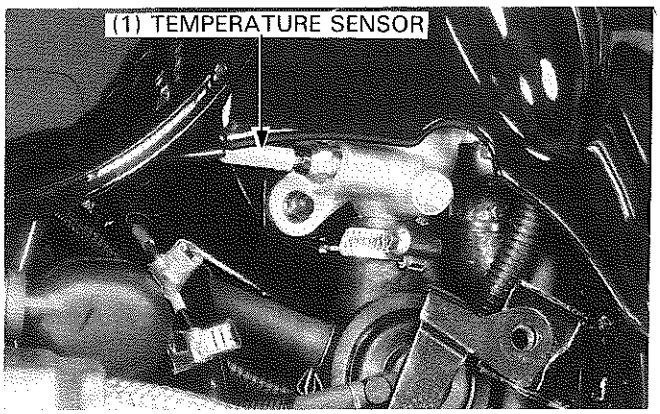


NOTE

- Keep the temperature for 3 minutes to confirm continuity. A sudden change of temperature will cause error temperature reading between the thermometer and switch.
- Do not let the switch or thermometer touch the pan as it will give a false reading.
- Immerse the switch in coolant up to its threads.

TEMPERATURE SENSOR

Disconnect the Green/Blue wire from the temperature sensor.



Check for continuity between the sensor body and ground.
There should be continuity.
If there is no continuity, check for thermostat housing for looseness and recheck.
Remove the horn.
Remove the temperature sensor from the thermostat housing.

Suspend the temperature sensor in a pan of coolant over a heater and measure the resistance through the sensor as the coolant heats up.

Temperature	50°C (122°F)	100°C (212°F)
Resistance	130–180 Ω	25–30 Ω

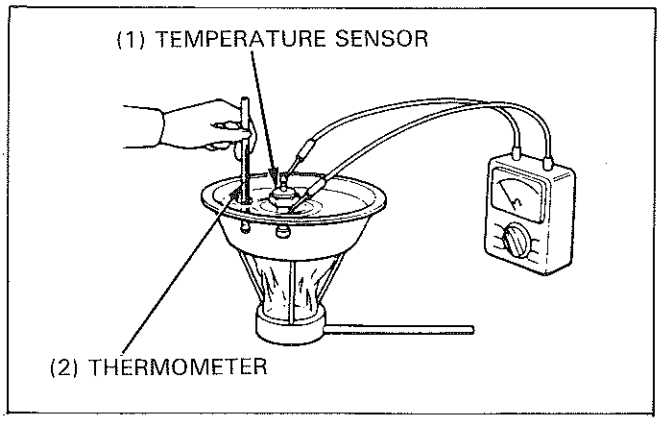
WARNING

- *Wear gloves and eye protection.*

NOTE

- The coolant must be used as the heated liquid to check the function above 100°C (212°F).
- You will get false readings if either the sensor or thermometer touches the pan.

Replace the sensor if it is out of specifications by more than 10% at any temperature listed.



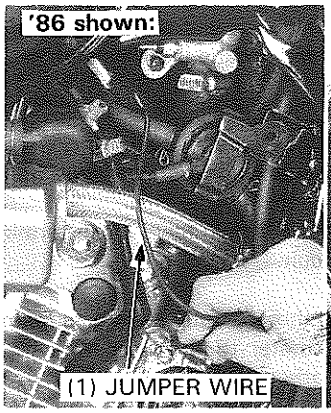
TEMPERATURE GAUGE

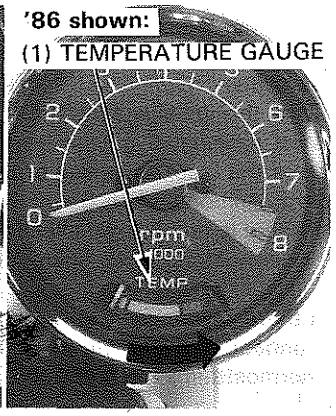
Disconnect the wire from the temperature sensor and short it to ground.

Turn the ignition switch to ON. The temperature gauge needle should move all the way to the right (H).

CAUTION

- *Do not leave the temperature sensor wire grounded for longer than a few seconds or the temperature gauge will be damaged.*

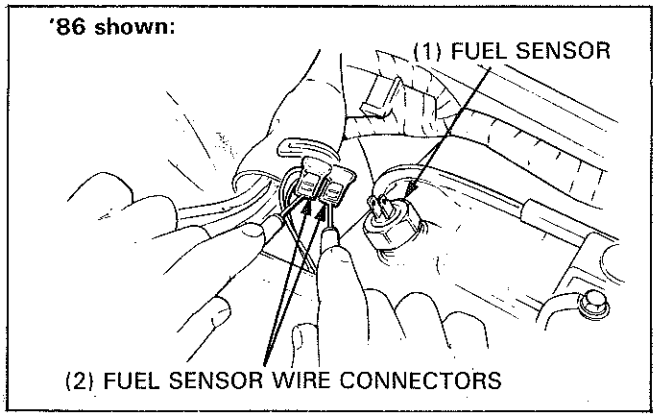




FUEL SENSOR

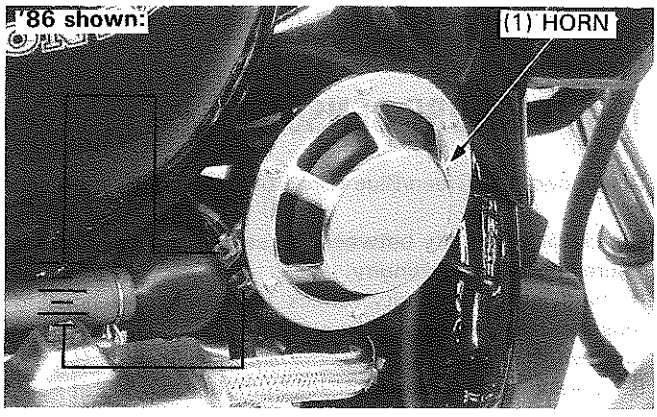
INSPECTION

The fuel warning light inspection has done before performing this test (page 21-11: **PILOT LAMP CHECKER**).
Remove the seats and disconnect the fuel sensor wire connectors.
Turn the ignition switch ON.
Measure the voltage between the Gray/Black (positive) and Green (negative) connectors of the fuel sensor wire.
There should be battery voltage with ignition switch ON.
If there is no voltage, check the wire harness for open or short circuit, or loose connection of the connectors.
If the warning light does not come on with the battery voltage comes on, replace the new fuel sensor.



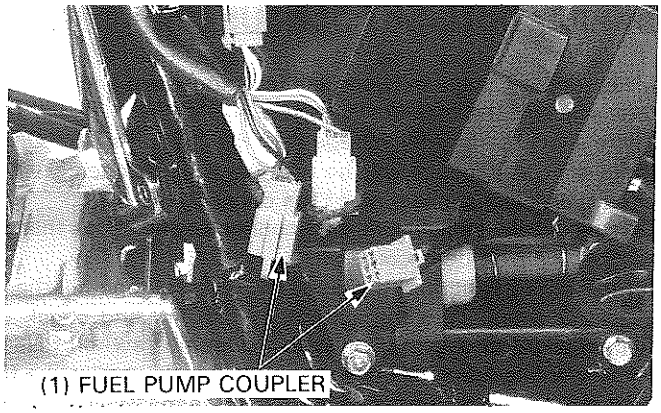
HORN

Disconnect the wire connectors from the horn and connect 12 V battery to the horn wire terminals.
The horn is normal if it sounds when the 12 V battery is connected across the horn terminals.



FUEL PUMP

Turn the ignition switch OFF.
Remove the left side cover and disconnect the fuel pump wire connectors.
Measure the voltage between the Bl (positive) and G (negative) terminals of the fuel pump connectors.
There should be battery voltage with the ignition switch ON.
If there is no voltage, check the wire harness for open or short circuit.
Turn the ignition switch OFF.
Short the Bl/Y and Bl wires with a jumper wire.

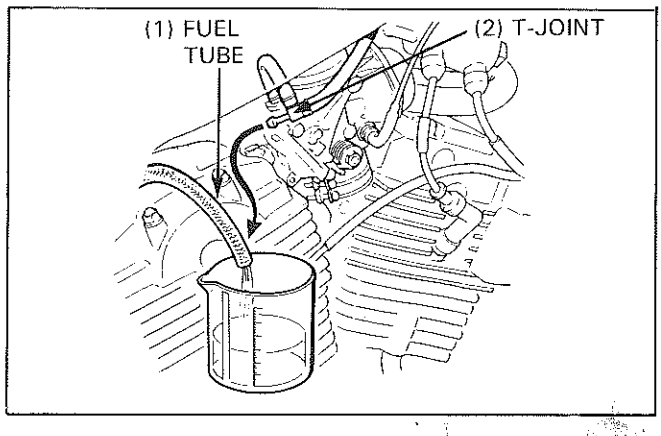


Remove the fuel tank mounting bolts and raise the fuel tank.

Disconnect the fuel tube from the T-joint near the carburetor and hold a graduated beaker under the fuel tube.

WARNING

- ***Do not allow flames or sparks near gasoline.***

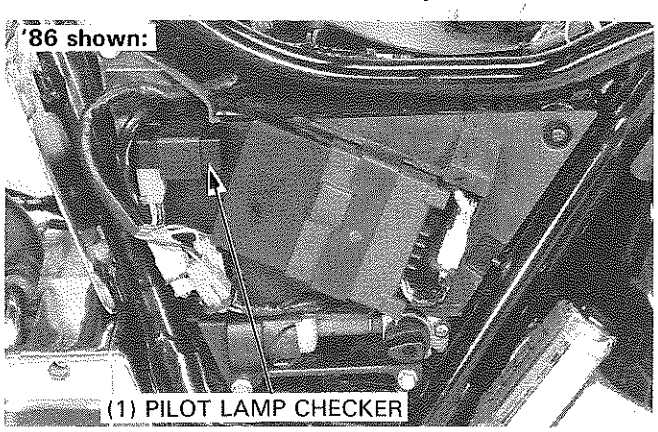


Turn the ignition switch ON and let the fuel flow into the beaker for 5 seconds, then turn the ignition switch OFF.
Multiply the amount in the beaker by 12 to determine the fuel pump flow capacity per minute.

FUEL PUMP FLOW CAPACITY:
700 cc (0.74 US qt, 0.62 Imp qt) min./minute

PILOT LAMP CHECKER

Disconnect the pilot lamp checker connector and measure the voltage between the Bl/Br (positive) and G (negative) terminals at the harness side connector.
There should be battery voltage with the ignition switch ON.
If there no voltage, check the wire harness for open or short circuit or loose connection of the connectors.

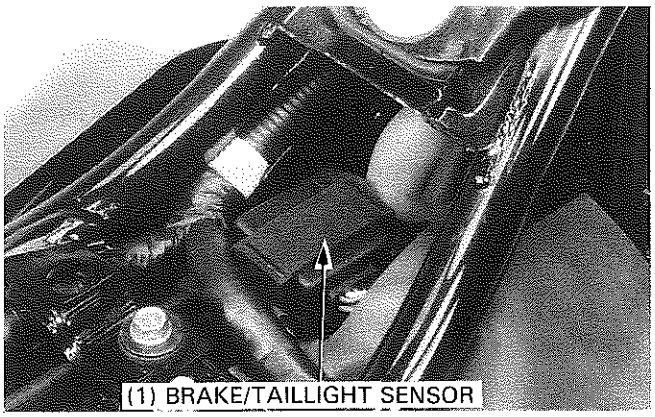


Disconnect the Gr/Bl (fuel warning) and W/Y (brake/taillight warning; '86 only) wires from the connector and ground them with a jumper wire.
Turn the ignition switch ON and check that the pilot lamps come on.
If the pilot lamps do not come on, check the pilot lamps and replace with new ones if necessary.

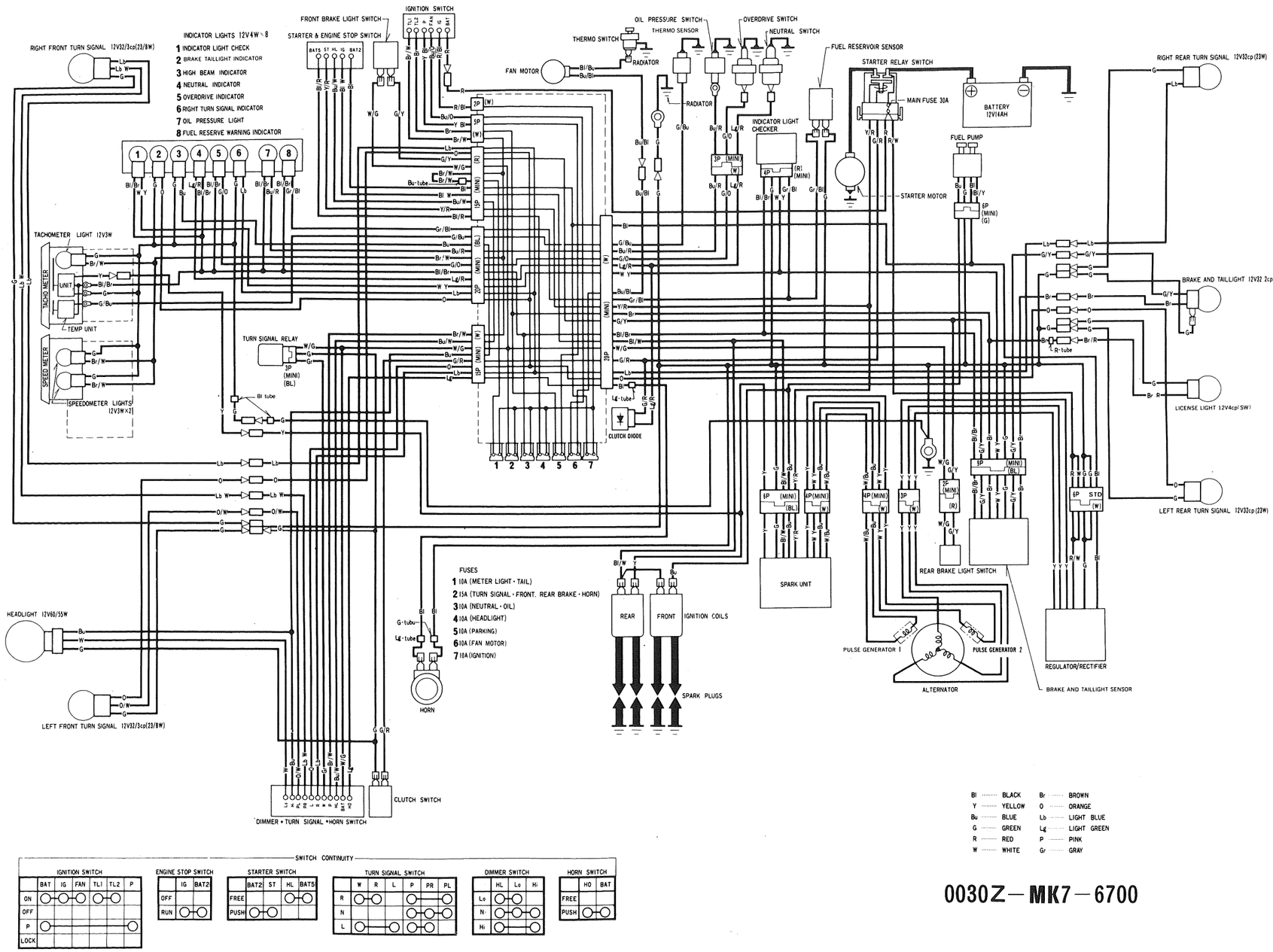
If the bulbs are good, replace the pilot lamp checker with a new one.

BRAKE/TAILLIGHT SENSOR ('86 only:)

Measure the voltage between the Bl/Br (positive) and G (negative) wires of the brake/taillight sensor.
There should be battery voltage with the ignition switch ON. If there is no voltage, check the wire harness for open or short circuit, or loose connection of the connectors.
Disconnect the taillight G/Y wire connector and check that the taillight warning does come on.
If the warning light does not come on, connect together the W/Y and G wires. Turn the ignition switch ON and check the warning light now comes on with the ignition switch ON.
If the warning light still does not come on, check that the taillight bulb and wire harness for short or open circuit.
Connect together the G/Y wires of the sensor connector and make sure that the brake/tail light comes on. If the taillight does not come on check the G/Y wires for short circuits.

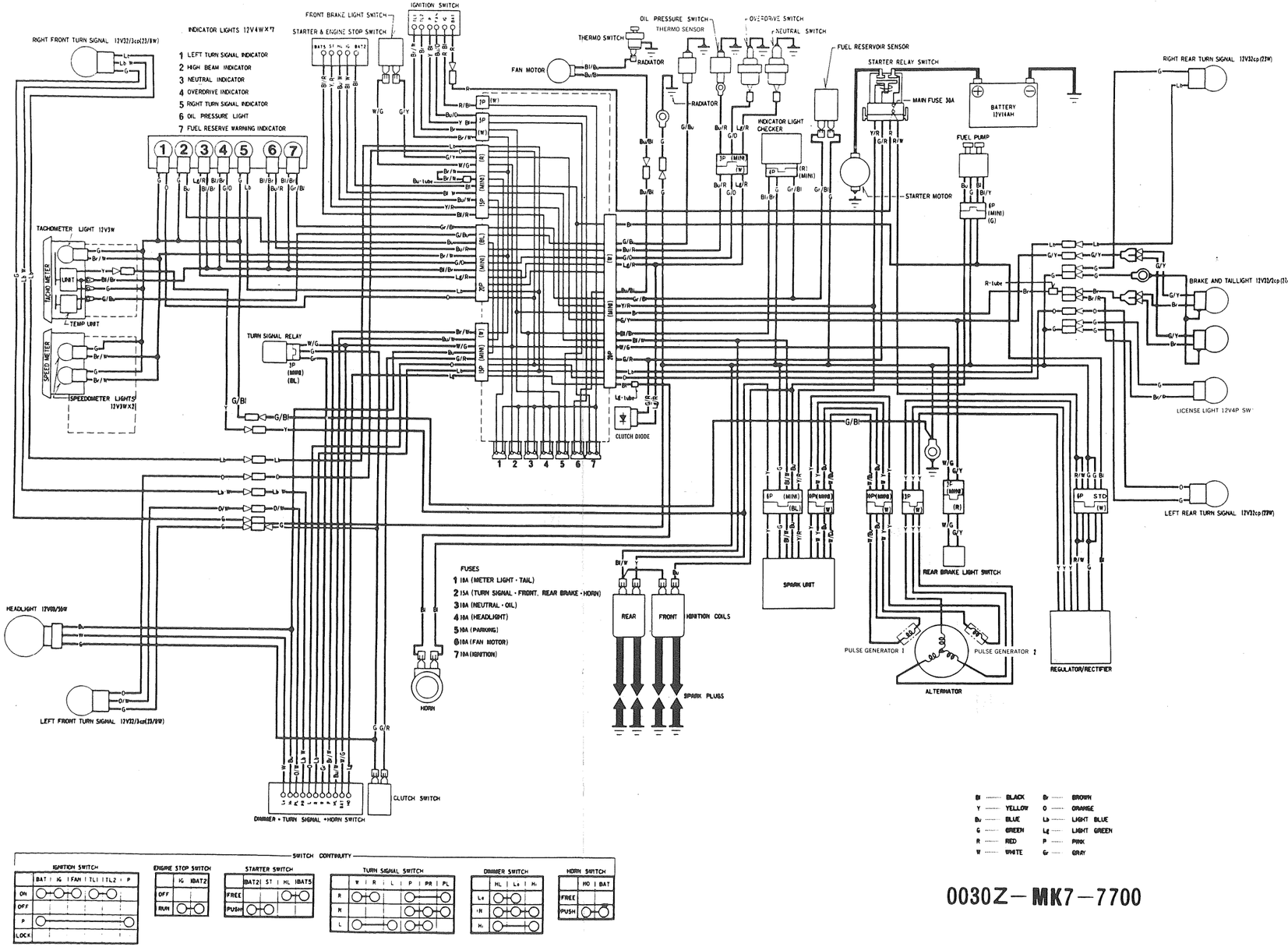

(1) BRAKE/TAILLIGHT SENSOR

'86 only:



0030Z–MK7–6700

After '86:



0030Z–MK7–7700

23. TROUBLESHOOTING

ENGINE DOES NOT START OR IS HARD TO START

		POSSIBLE CAUSE
1. Check fuel flow to carburetor.	NOT REACHING CARBURETOR →	(1) Fuel tank empty. (2) Clogged fuel tube or fuel filter. (3) Sticking float valve. (4) Faulty fuel pump. (5) Clogged fuel tank breather.
REACHING CARBURETOR ↓		
2. Perform a spark test.	WEAK OR NO SPARK →	(1) Faulty spark plugs. (2) Fouled spark plugs. (3) Faulty spark unit. (4) Broken or shorted spark plug wires. (5) Broken or shorted ignition coil. (6) Faulty ignition switch. (7) Faulty pulse generator. (8) Faulty engine stop switch. (9) Loose or disconnected ignition system wires.
GOOD SPARK ↓		
3. Test cylinder compression.	LOW COMPRESSION →	(1) Valve stuck open. (2) Worn cylinder and piston rings. (3) Damaged cylinder head gasket. (4) Seized valve. (5) Improper valve timing.
COMPRESSION NORMAL ↓		
4. Start by following normal procedure.	ENGINE STARTS BUT STOPS →	(1) Improper choke operation. (2) Carburetor incorrectly adjusted. (3) Intake pipe leaking. (4) Improper ignition timing (Faulty spark unit or pulse generator). (5) Fuel contaminated.
ENGINE DOES NOT FIRE ↓		
5. Remove and inspect spark plug.	WET PLUG →	(1) Carburetor flooded. (2) Choke closed. (3) Throttle valve open. (4) Air cleaner dirty.

ENGINE LACKS POWER

		POSSIBLE CAUSE
1. Raise wheels off ground and spin by hand. WHEEL SPINS FREELY	WHEELS DO NOT SPIN FREELY →	(1) Brake dragging. (2) Worn or damaged wheel bearings. (3) Wheel bearings need lubrication. (4) Final gear bearing damaged.
2. Check tire pressure. PRESSURE NORMAL	PRESSURE LOW →	(1) Punctured tire. (2) Faulty tire valve.
3. Accelerate rapidly from low to second. ENGINE SPEED LOWERED WHEN CLUTCH IS RELEASED	ENGINE SPEED NOT CHANGED WHEN CLUTCH IS RELEASED →	(1) Clutch slipping. (2) Worn clutch disc/plate. (3) Warped clutch disc/plate. (4) Weak clutch spring.
4. Accelerate lightly. ENGINE SPEED INCREASES	ENGINE SPEED DOES NOT INCREASE →	(1) Carburetor choke closed. (2) Clogged air cleaner. (3) Restricted fuel flow. (4) Clogged muffler. (5) Pinched fuel tank breather. (6) Faulty fuel pump.
5. Check ignition timing. CORRECT	INCORRECT →	(1) Faulty spark unit. (2) Faulty pulse generator.
6. Check hydraulic tappet conditions. CORRECT	INCORRECT →	(1) Clogged tappet oil holes. (2) Worn valve seat. (3) Damaged tappet.
7. Test cylinder compression. NORMAL	TOO LOW →	(1) Valve stuck open. (2) Worn cylinder and piston rings. (3) Leaking head gasket. (4) Improper valve timing.
8. Check carburetor for clogging. NOT CLOGGED	CLOGGED →	(1) Carburetor not serviced frequently enough.
9. Remove spark plug. NOT FOULED OR DISCOLORED	FOULED OR DISCOLORED →	(1) Plugs not serviced frequently enough. (2) Spark plug of incorrect heat range.
10. Check oil level and condition. CORRECT	INCORRECT →	(1) Oil level too high. (2) Oil level too low. (3) Contaminated oil.
11. Remove cylinder head cover and inspect lubrication. VALVE TRAIN LUBRICATED PROPERLY	VALVE TRAIN NOT LUBRICATED PROPERLY →	(1) Clogged oil passage. (2) Clogged oil control orifice.

12. Check for engine overheating.	OVERHEATING →	(1) Excessive carbon build-up in combustion chamber. (2) Use of poor quality fuel. (3) Clutch slipping. (4) Lean fuel mixture. (5) Wrong type of fuel.
NOT OVERHEATING ↓		
13. Accelerate or run at high speed.	ENGINE KNOCKS →	(1) Worn piston and cylinder. (2) Wrong type of fuel. (3) Excessive carbon build-up in combustion chamber. (4) Ignition timing too advanced (Faulty spark unit). (5) Lean fuel mixture.
ENGINE DOES NOT KNOCK		

POOR PERFORMANCE AT LOW AND IDLE SPEEDS

		POSSIBLE CAUSE
1. Check ignition timing and hydraulic tappet condition.	INCORRECT →	(1) Tappet oil holes clogged. (2) Tappet damaged. (3) Improper ignition timing. (Faulty spark unit).
CORRECT ↓		
2. Check carburetor pilot screw adjustment.	INCORRECT →	See Fuel System Section.
CORRECT ↓		
3. Check for leaking intake pipe.	LEAKING →	(1) Loose insulator clamps. (2) Damaged insulator.
NO LEAK ↓		
4. Perform spark test.	WEAK OR INTERMITTENT SPARK →	(1) Faulty, carbon or wet fouled spark plug. (2) Faulty spark unit. (3) Faulty ignition coil. (4) Broken or shorted spark plug wires. (5) Faulty engine stop switch (6) Faulty pulse generator. (7) Faulty ignition switch. (8) Loose or disconnected ignition system wires.
GOOD SPARK		

POOR PERFORMANCE AT HIGH SPEED

1. Check ignition timing and hydraulic tappet condition.	INCORRECT →	(1) Damaged hydraulic tappet. (2) Faulty spark unit. (3) Faulty pulse generator.
CORRECT ↓		
2. Disconnect fuel tube at carburetor.	FUEL FLOW RESTRICTED →	(1) No fuel in tank. (2) Clogged fuel line. (3) Clogged fuel tank breather. (4) Clogged fuel filter. (5) Faulty fuel pump.
FUEL FLOWS FREELY ↓		

3. Remove carburetor and check for clogged jets. — CLOGGED → Clean.

NOT CLOGGED

4. Check valve timing. — INCORRECT → Cam sprocket not installed properly.

CORRECT

5. Check valve spring tension. — WEAK → Faulty spring.

NOT WEAKENED

POOR HANDLING → Check tire pressure

1. If steering is heavy. →
   (1) Steering stem adjustment nut too tight.
   (2) Damaged steering head bearings.

2. If either wheel is wobbling. →
   (1) Excessive wheel bearing play.
   (2) Bent rim.
   (3) Improperly installed wheel hub.
   (4) Swingarm pivot bearing excessively worn.
   (5) Bent frame.
   (6) Swingarm pivot adjusting bolt too tight.

3. If the motorcycle pulls to one side. →
   (1) Faulty shock absorber.
   (2) Front and rear wheels not aligned.
   (3) Bent front fork.
   (4) Bent swingarm.
   (5) Bent front axle.

HYDRAULIC TAPPET

NOISY TAPPET

1. Check for low oil level.
   Ride for five minutes with the engine speed over 3,000 rpm.
   Check oil level and condition. — INCORRECT →
   (1) Contaminated oil.
   (2) Contaminated oil filter.

CORRECT

2. Check oil pressure. — TOO LOW →
   (1) Clogged oil passage.
   (2) Clogged oil control orifice.
   (3) Oil level too low.

NOT CLOGGED

3. Remove cylinder head cover and oil hole caps and check lubrication. — NOT LUBRICATED PROPERLY →
   (1) Clogged oil pipe.
   (2) Faulty O-ring.
   (3) Faulty oil hole cap.

CORRECT

4. Remove hydraulic tappet and check. — INCORRECT →
   (1) Plunger sticking.
   (2) Faulty tappet.
   (3) Faulty one way valve.

CORRECT

ENGINE LACKS POWER

1. Turn the engine for a few seconds with the starter.	ENGINE STARTS →	(1) Bubbly engine oil with over rev up.
ENGINE DOES NOT START ↓		
2. Check oil pressure.	TOO LOW →	(1) Oil level too low. (2) Clogged oil passage. (3) Contaminated oil. (4) Contaminated oil filter.
CORRECT ↓		
3. Remove tappet and check	INCORRECT →	(1) Faulty tappet (Replace).

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